

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

# DIESEL PROGRESS

GAS TURBINE

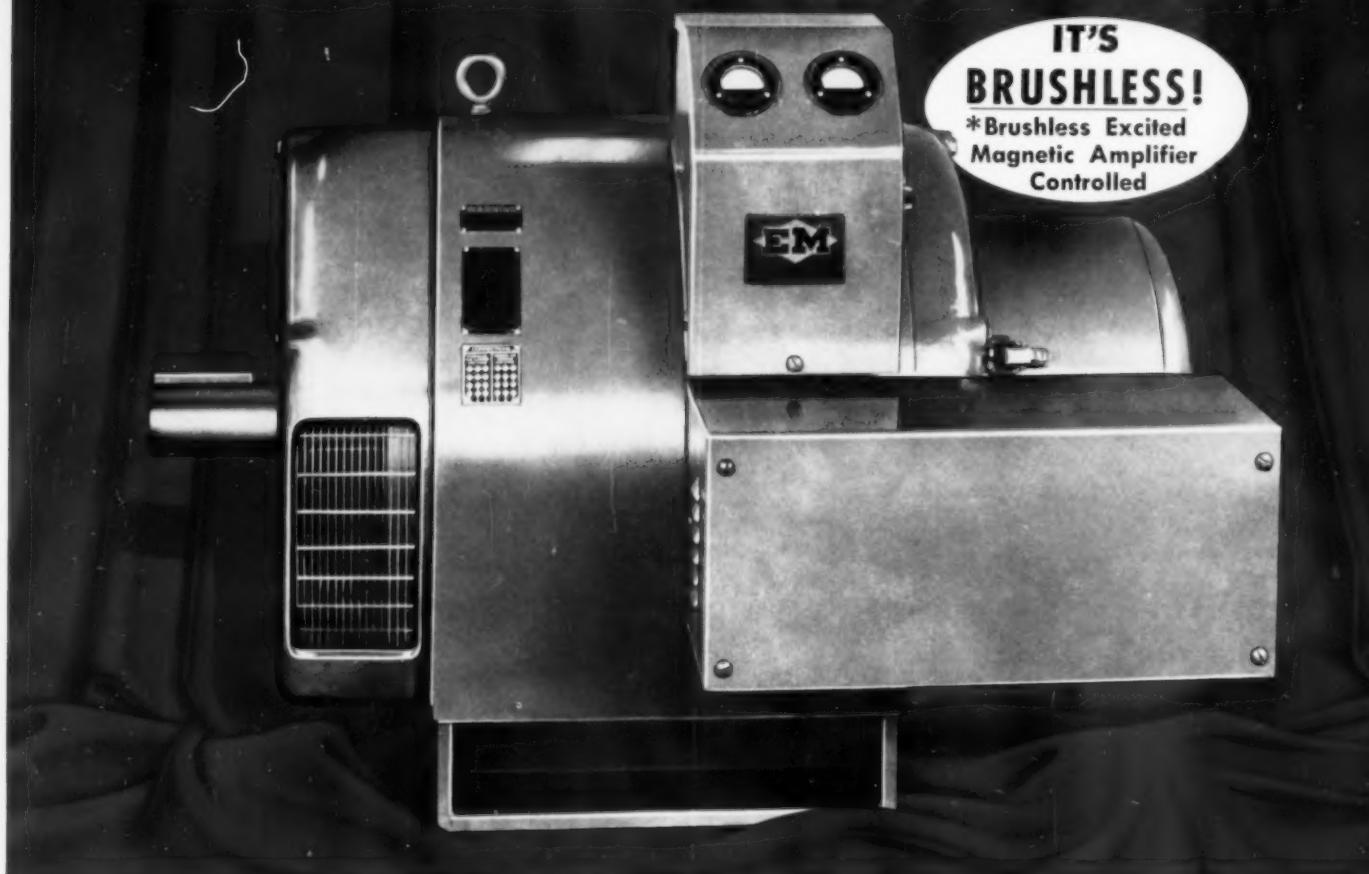


FIVE DOLLARS PER YEAR

FEBRUARY, 1959

FIFTY CENTS PER COPY

**NOW for men who hate maintenance...  
the NEW E-M BEMAC\* Packaged Generator**



**RUGGED, RIGHT and READY  
with 10 BIG ADVANTAGES for you**

- 1. LICKS THE MAINTENANCE PROBLEM.** BEMAC has no commutator, no slip rings, no brushes! Requires no servicing other than an occasional bearing check.
- 2. SAFER IN HAZARDOUS ATMOSPHERES.** No sparking contacts in the regulator or excitation system. Eliminates need for special enclosure on many applications.
- 3. SIMPLE TO OPERATE.** No complicated servicing or adjustments — anyone can operate BEMAC.
- 4. MAGNETIC AMPLIFIER "MAGIC"** automatically regulates voltage — a unique static voltage sensing circuit keeps the voltage "on the beam."
- 5. POSITIVE VOLTAGE CONTROL** — easily set to help compensate for line voltage drop.
- 6. "ROCK-STEADY" VOLTAGE** makes your motors, lights, and electronic equipment work better.
- 7. BROAD-RANGE VOLTAGE** makes it simple to get the voltage you need . . . 120/208-139/240 and 240/416-277/480 volts.
- 8. STARTS BIG MOTORS.** Built-in voltage boost transformer makes big motor starting easier.
- 9. EASY TO INSTALL.** BEMAC is self-contained, completely factory assembled.
- 10. BACKED BY 60 YEARS' EXPERIENCE** by the country's largest manufacturer of "Packaged" Generators . . . your best assurance of top quality performance and long life from every heavy-duty BEMAC "Packaged" Generator.



**ELECTRIC MACHINERY**

*The finest in "Packaged" Generators*



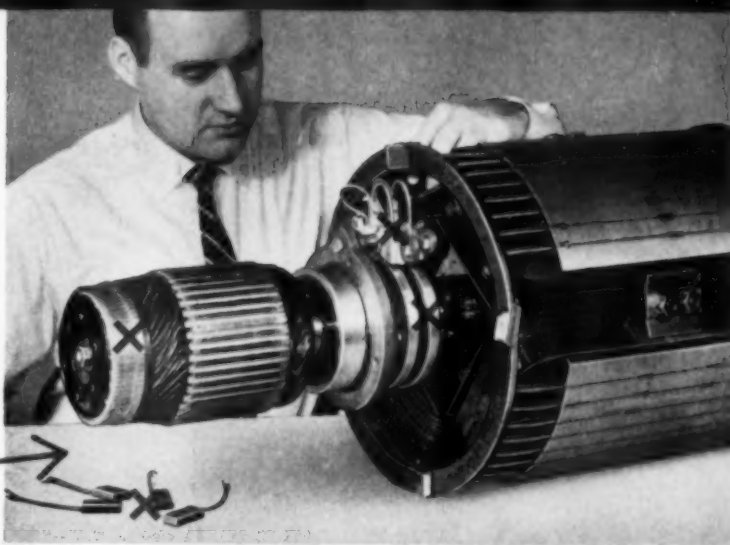
# NO COMMUTATOR NO SLIP RINGS, NO BRUSHES

**BEMAC is better suited for corrosive, dusty, and hazardous atmospheres**

Conventional generators receive D-C excitation from exciters thru commutator, slip rings, and brushes. In BEMAC these parts are replaced by static silicon rectifiers.

LOOK WHAT  
HAPPENED TO  
MAINTENANCE...

WHEN WE  
SUBSTITUTED AGELESS  
SILICON RECTIFIERS



Many points of wear and maintenance now can be eliminated.

There are no moving electrical contacts — spark-  
ing is eliminated. There are no electrical parts  
subject to wear and damage from dust and dirt —  
you have highest operating reliability.

Your E-M Field Engineer will be glad to give you  
more information on E-M BEMAC "Packaged"  
Generators equipped with automatic static volt-  
age regulators. BEMAC is available in ratings of  
10 thru 150 kw, 3 phase; 10 thru 100 kw, 1  
phase; 1200 and 1800 rpm; 0.8 PF; 60 cycle;  
120/208-139/240 and 240/416-277/480 volts,  
3 phase; 120/240 volts, 1 phase.

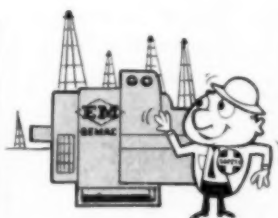
● **New Literature:** Write factory for your copy of  
publication No. 255. It tells how BEMAC works.



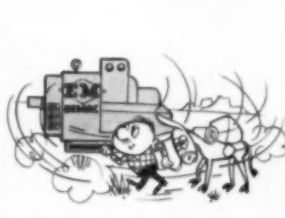
A.C. to D.C. rectification is made with reliable, efficient silicon diodes.



LESS RADIO INTERFERENCE



SAFER IN HAZARDOUS  
ATMOSPHERES



MORE DUST RESISTANT



LESS AFFECTED  
BY CORROSION

**MFG. COMPANY** MINNEAPOLIS 13, MINNESOTA  
from the Originators of "Packaged" Generators



**GM HEAT EXCHANGERS COOL ONE OF AMERICA'S LARGEST LUXURY YACHTS—  
HAS 1400-MILE CRUISING RANGE WITH HARRISON-COOLED DIESEL POWER!**



Harrison Heat Exchangers  
—Top-Quality Products  
of General Motors Re-  
search and Engineering.



Harrison keeps temperatures shipshape on the *Seven Seas*. The engine oil for the two powerful GM Diesels aboard this fabulous 90-foot pleasure cruiser is cooled by Harrison. From full power to leisurely cruising, heat's never a problem. Harrison heat exchangers are backed by General Motors' engineering and research, and more than 48 years' experience in the manufacture of top-quality heat-control products. That's why Harrison heat exchangers are specified on all types of the finest Diesel equipment—marine, industrial and automotive. If you have a cooling problem, look to Harrison for the answer.

TEMPERATURES MADE TO ORDER  
**HARRISON**  
AIRCRAFT, AUTOMOTIVE, MARINE AND INDUSTRIAL HEAT EXCHANGERS



HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

# DIESEL PROGRESS

INCORPORATING  
GAS TURBINE  
PROGRESS

REX W. WADMAN

Editor and Publisher

MEMBER OF



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IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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### FRONT COVER ILLUSTRATION

Most powerful towboat  
on the inland water-  
ways, the 180 ft. M/V  
United States is pow-  
ered by four Cooper-  
Bessemer engines total-  
ling 8500 hp.



# thrifty cities protect power budgets with SUPERIOR ENGINES



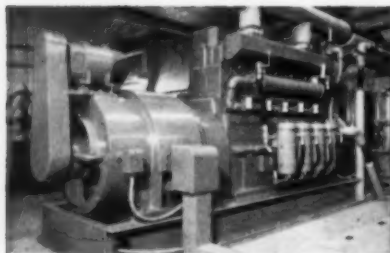
More and more cities with budget-conscious administrators are wisely specifying White Superior diesel or gas engines for water, sewage treatment and power plants. They find that both fuel and maintenance costs are reduced whenever these dependable, economical engine generator sets go to work as prime power, supplementary power or standby power.

Singly or in multiples, compact, completely self-contained Superior power packages consistently produce high output for size. Diesels can operate continuously on non-premium fuel, while gas engines perform efficiently on natural, LP or free sewage gas. Because Superior has simplified engine construction to the highest degree possible—and uses only the most rugged, high quality parts—fewer replacements are required and maintenance is reduced to an absolute minimum.

White can custom-engineer Superior engines to your exact requirements and apply its extensive experience with automatic, unattended and remote control operations to your problem. If your requirements range from 215 to 2150 horsepower, or 150 to 1500 KW, call on White Superior engines to protect your power budget!

## White Diesel

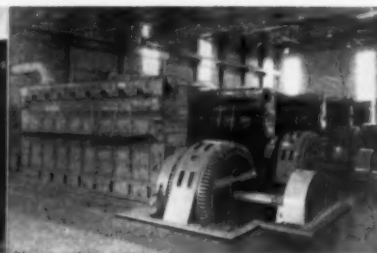
WHITE DIESEL ENGINE DIVISION, WHITE MOTOR COMPANY, Plant and General Offices, Springfield, Ohio



ALBUQUERQUE, NEW MEXICO... Superior 6G-825 gas engine generator set (250 KW) at Sewage Disposal Plant No. 1. Engine operates on sewage gas and/or natural gas.



LIMA, OHIO... Superior 40-SX-8 diesel engine generator set (500 KW) at city waterworks. Unit is on duty as standby power.



TUCSON, ARIZONA... Five Superior 80-GDSX-8 dual-fuel engine generator sets (each 1000 KW) at TRICO Electric Co-op Inc. County-wide power for farming and residential requirements.

## ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL  
EDWARD KEEBLE CONSTRUCTION CO.  
FIRM San Jose, California

### RPM DELO Oil keeps tractor on the job 15 years



**Still Working** after 15 years using RPM DELO Oil in this D-8 Caterpillar operated by Edward Keeble Construction Co. Block, crankshaft, and most other parts of original engine are still in use. Another of firm's D-8's using RPM DELO Oil ran 12,000 hours without engine repairs. When torn down, maximum crankshaft wear was .004".



**Crawler Crane**, like firm's other heavy-duty equipment, uses RPM DELO Oil. Keeble operates 120 pieces of construction equipment—has as many as 30 jobs going at once.



**GMC V-8 10-Yard Dump Truck** (left), one of a new fleet of 12, also uses RPM DELO Oil. Mr. Keeble (right), says, "For the past 15 years we have kept our heavy-duty engines in top operating condition with RPM DELO Oil. In several instances engines have actually outlasted equipment."



TRADEMARK "RPM DELO" AND  
DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20  
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

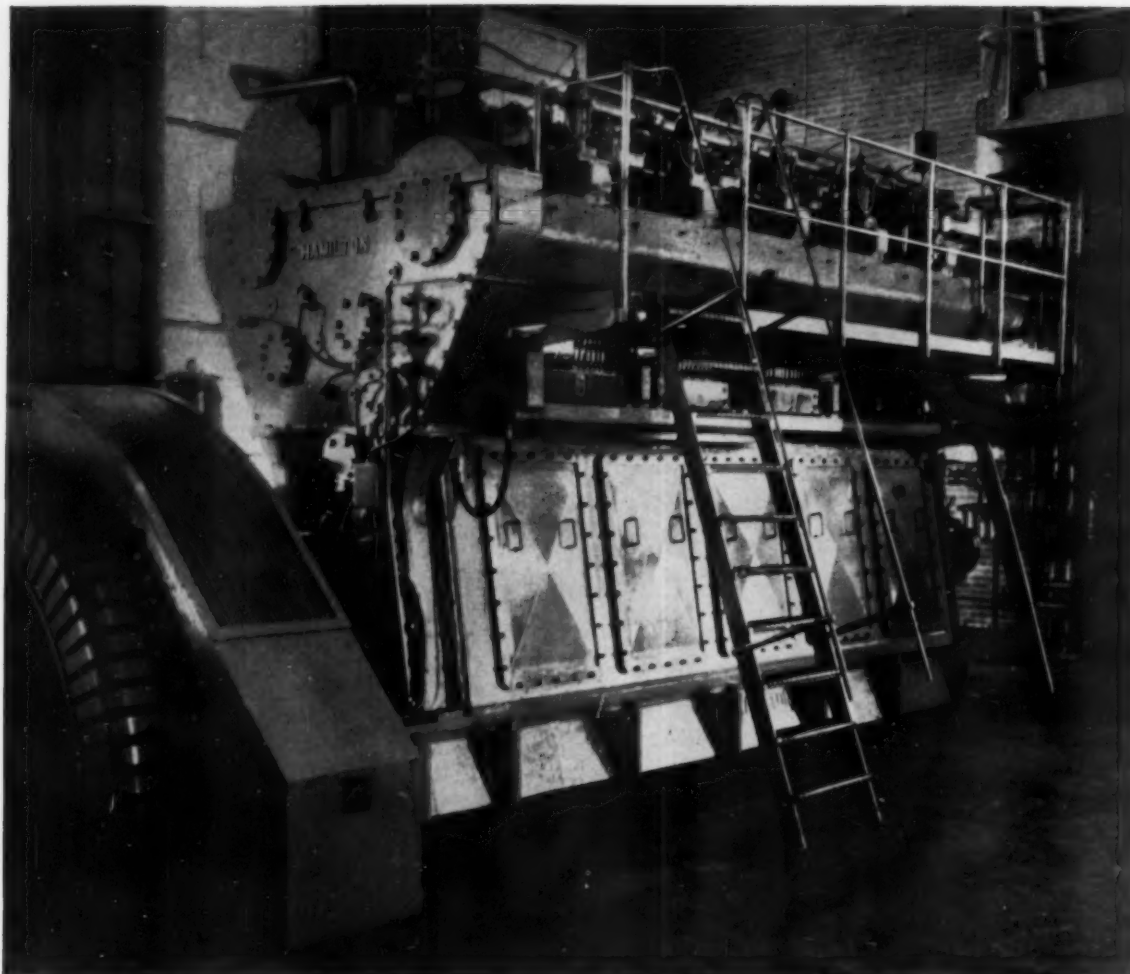
#### Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts - hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming



For More Information or field help with any fuel or lubrication problem, contact representative of any company listed, or write direct.

STANDARD OIL COMPANY OF TEXAS, El Paso  
THE CALIFORNIA COMPANY, Denver 1, Colorado



Hamilton Model 521 SA diesel engine shown above is capable of burning the heaviest bunker oil with absolutely clean exhaust.

## Pay for a quarter-million-dollar diesel unit with fuel savings alone!

That's what the City of Edmundston, New Brunswick, Canada, will do in 6 short years in operating its new 8,815,000 kwhr per year generator. The reason is the fuel-burning efficiency of its Hamilton-made Diesel 521 SA engine. Because of its unique Hamilton-designed rotary exhaust valve system, this engine is capable of operating on bunker-C residual

fuel at only 11.6c per gallon—as compared with 18.6c for distillate fuels required with ordinary diesels.

Last year this Hamilton Diesel-powered generator effected operating fuel cost savings of \$44,000. And further savings are expected following installation now under way of a hot water heat exchanger in the engine exhaust. Eventual cost per

kwhr is expected to be as low as 6.5 mills. Light fuel is employed only while starting, and for about 20 minutes before shutting down to flush fuel lines and injectors. Heavy residual oil is used for all other normal operations. Write today for complete details on how Hamilton's Model 521 SA Diesel can bring you substantial savings.

**Hamilton Division** Hamilton, Ohio

**BALDWIN • LIMA • HAMILTON**

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools





# Mechling "Margaret C"

## FEATURES WICHITA SLIP CLUTCH



... assures smoother operation, positive control, quick response, lower maintenance

The advantages of the engine with the Wichita Clutch assembly are:

1. Positive control of propellor speed throughout the entire range;
2. Smoother operation with single remote lever control;
3. Quick response giving operator "feel" of vessel;
4. Sharply reduced maintenance costs.

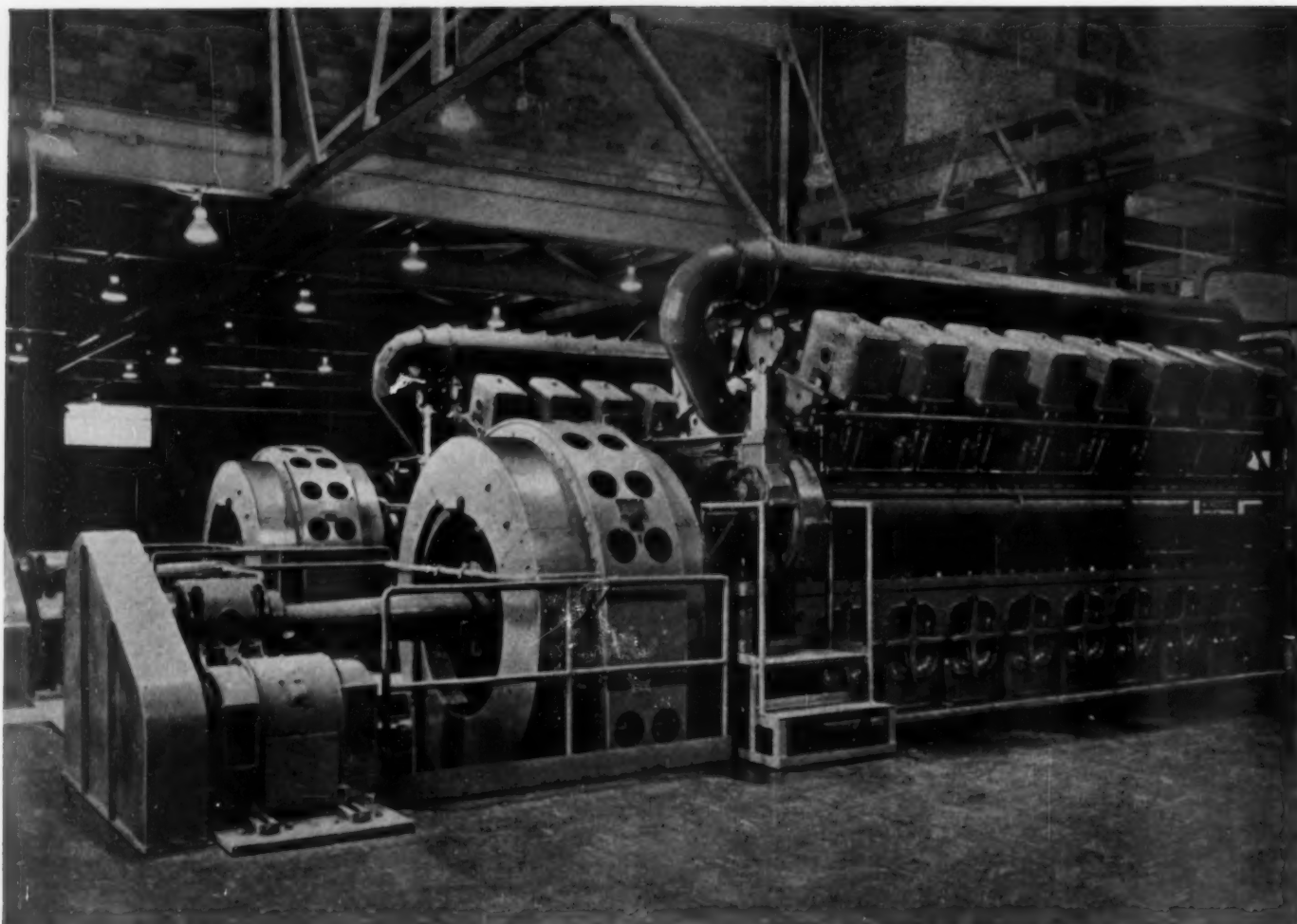
*Write or wire for details*

WICHITA CLUTCH COMPANY, INC. • WICHITA FALLS, TEXAS



Engine room view of the "Margaret C" showing the Wichita Clutch assembly





Texaco Ursa Oil lubricates each of these V-type 16-cylinder diesels which supply standby power in Narragansett Electric Co.'s Westerly, R. I., plant.

Bore and stroke of each engine is 13 x 16 1/4"; each is rated at 3,500 hp at 514 rpm. Each generator has a net rating of 2,500 kw.

## Texaco Ursa Oil protects Narragansett's reserve power

Narragansett Electric Company uses these two Supair-thermal V-16 diesels for standby power. It's essential that these engines be instantly available, even after long periods of idleness. That's why Narragansett uses Texaco Ursa Oil to protect engine power, keep it reliable and ready—anytime.

With Texaco Ursa Oil in the crankcases, Narragansett engineers are certain of getting full rated horsepower because Texaco Ursa Oil keeps rings free and prevents the formation of harmful deposits. And because Texaco Ursa Oil is a premium quality lubricant, it protects against wear, minimizes operating and maintenance costs.

There is a complete line of Texaco Ursa Oils refined and processed especially for the lubrication of diesel, gas and dual-fuel engines. In fact, *for over twenty-years, more stationary diesel horsepower in the United States*

*has been lubricated with Texaco than with any other brand.*

Your Texaco Lubrication Engineer offers his years of experience to help you select the right Texaco lubricant for your needs. You can contact him by calling the nearest of the more than 2,000 Texaco Distributing Plants, or by writing: The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



# 40 MPH!

Fastest crew boat ever built!

Powered by two Solar  
Jupiter<sup>®</sup> gas turbine engines

**THIS SPEEDY 52-FOOT** aluminum-hulled craft can save up to several thousand dollars daily in commercial operations. Built by Higgins, Inc., the boat is powered by two Solar Jupiter 500 hp gas turbines. Weight of the complete power package is 4400 lb—1/6th the

**ENGINEERS WANTED!** *Challenging projects, unlimited opportunities with Solar. Write today!*

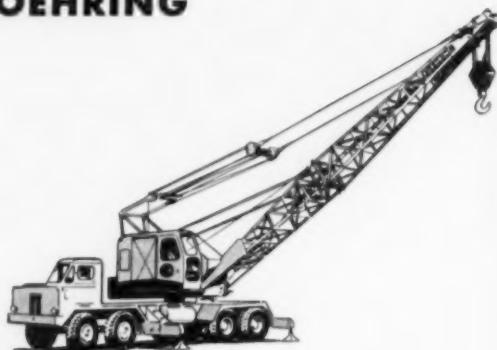
weight of conventional engines of equivalent power and service life. Other Jupiter advantages include instant power for extreme maneuverability, no vibration, easy maintenance, low noise and ability to burn a variety of fuels. Write for details to Dept.

F-117, Solar Aircraft Company, San Diego 12, California.



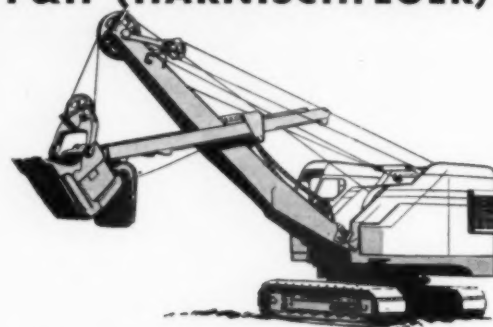


## KOEHRING



Koehring Model 445 Truck Crane (45 tons) . . . available with a Twin Disc 1500 Series Single-Stage Torque Converter.

## P & H (HARNISCHFEGER)



P & H (Harnischfeger) Model 655B with 1½-yard bucket, available with a Twin Disc 11,500 Series Three-Stage Torque Converter. P & H also offers 3½-yard 1055 Series with Twin Disc 13,800 Series Torque Converter.

## MANITOWOC



Manitowoc Model 3600 Shovel with 3-yd. bucket . . . offered with a Twin Disc 10,000 Series or 11,500 Series Three-Stage Torque Converter. Six other Manitowoc Models are available with Twin Disc Three-Stage Torque Converters.

## MARION



Marion Type 111-M Shovel with 4-yd. bucket, offered with a Twin Disc 11,500 Series Three-Stage Torque Converter. Six other Marion Models, from ½ through 3 yds., available with Twin Disc 10,000 Series Three-Stage Torque Converters.

# Contractors . . . specify the same that's in your crawler

All of the machines shown here have one thing in common . . . each is offered with an optional Twin Disc Torque Converter, the same make that's in your crawler tractor fleet, whether the machines are yellow, orange or red. Twin Disc Torque Converters have proved their efficiency and dependability in millions of hours of use in Allis-Chalmers, Caterpillar and International crawler tractors!

These leading excavator manufacturers offer Twin Disc Three-Stage or Single-Stage Torque Converters as either standard or optional

equipment . . . for seven good, profitable reasons:

- Twin Disc Torque Converters eliminate lugging and stalling . . . permit engines to operate at maximum speed and efficiency . . . with maximum horsepower always available . . . regardless of load!
- Standardization of Torque Converters reduces maintenance problems . . . slashes spare parts inventories . . . saves time and money.
- Twin Disc Torque Converters cushion out destructive shocks and vibrations normally transmitted by

direct-drives . . . for *less parts wear and replacement . . . for greater productivity year in and year out!*

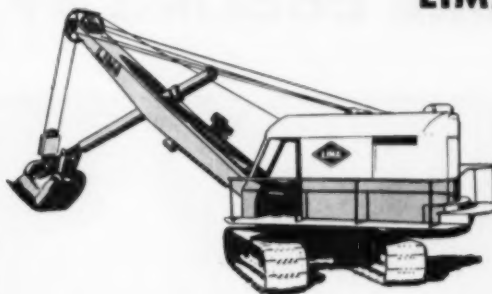
- On a shovel, they deliver up to twice normal torque to the drum—an important advantage in power delivered at slow digging speeds.
- On a crane or clamshell arrangement, they permit safe, accurate control of loads and delicate inching and holding under power.
- They provide an infinite variety of torque ratios . . . automatically and instantaneously . . . according to load demands.

## BUCYRUS-ERIE



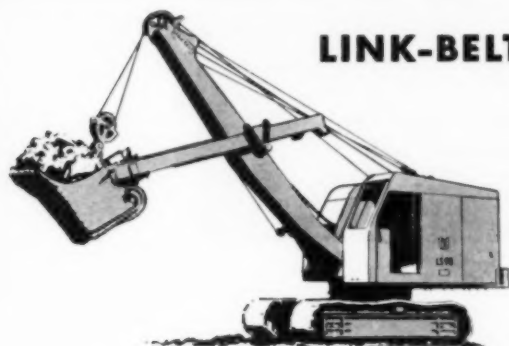
Bucyrus-Erie Model 30-B Shovel with 1-yard bucket . . . available with a Twin Disc 10,000 Series Three-Stage Torque Converter.

## LIMA



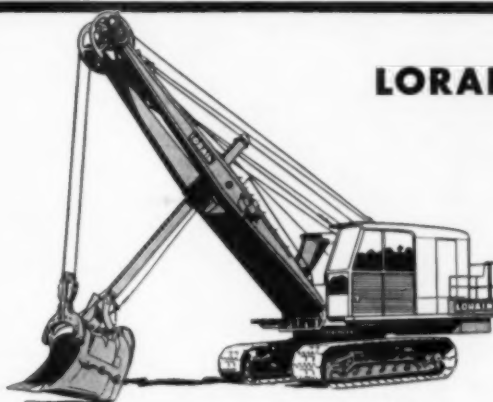
Lima Type 703 Shovel with 1 1/4-yd. bucket . . . available with a Twin Disc 10,000 Series Three-Stage Torque Converter, which is also offered on Lima Type 803 2 1/2-yd. Shovel. Other Lima products offer Twin Disc Torque Converters and PTO's.

## LINK-BELT



Link-Belt Speeder Model 98 with 1-yd. bucket . . . available with a Twin Disc 1500 Series Single-Stage Torque Converter.

## LORAIN



Lorain-85A Shovel with 2 1/2-yd. bucket . . . offered with a Twin Disc 10,000 Series Three-Stage Torque Converter. Twin Disc also available on Lorain-26 Model 3/4-yard Shovel.

## converter tractor!

- They extend cable life, cut cable costs . . . by eliminating sharp impact loads . . . by providing constant line tension without dangerous snapping or jerking.

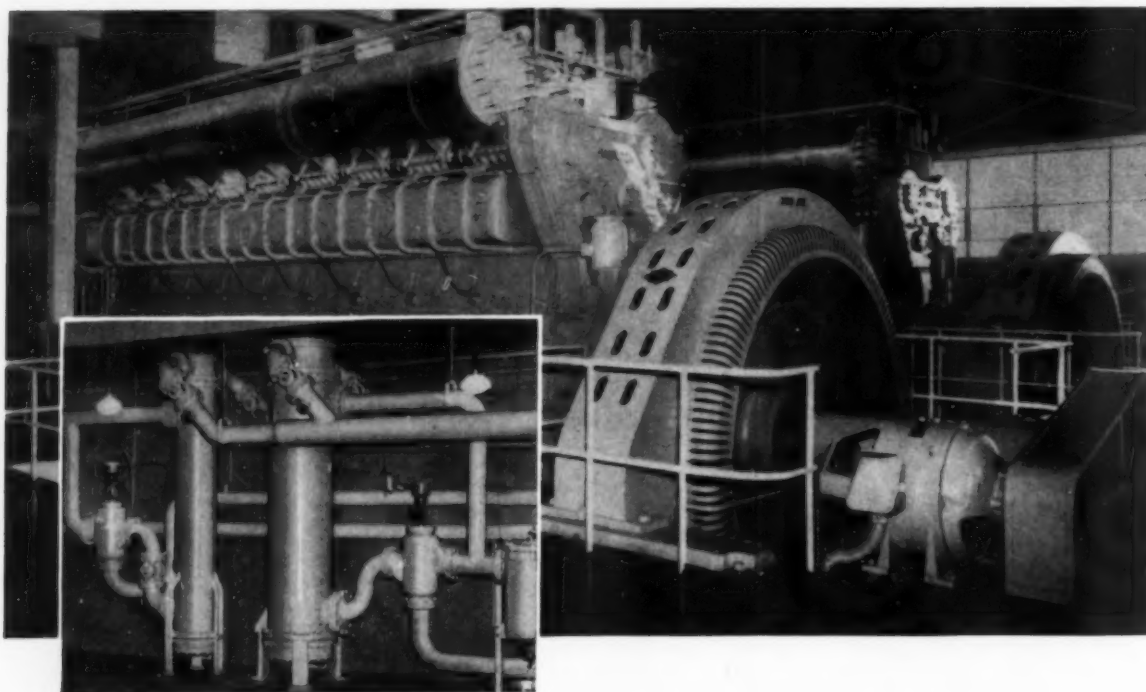
*Twin Disc Torque Converters—three-stage or single-stage, from 30 to 1000 hp—are available from all leading excavator manufacturers. Specify one in your next machine. See for yourself why users throughout industry say: A Twin Disc Torque Converter is the wisest investment you can make when buying heavy-duty machinery.*

### TWIN DISC CLUTCH COMPANY

Racine, Wisconsin  
Hydraulic Division, Rockford, Illinois



## ENGINE COOLING BY ROSS



### two 4800 hp Hamiltons step up power for 4800 sq. mile area

**FROM GREAT BEND**, right in the heart of "The Wheat State", the Central Kansas Electric Cooperative Inc. supplies power to nine counties over an area of 4800 square miles. Recently, two 4800 hp Baldwin-Lima-Hamilton dual-fuel engines were added to the facilities, to meet the increasing power demands of private consumers, utilities and local industries.

**TO KEEP** these engines running at safe operating temperatures, vertically mounted Ross Exchangers have been furnished to cool both lube oil and jacket water. With every vital part protected by safe, dependable heat removal, reliable performance is assured over long periods of continuous service.

**"OUR EXPERIENCE** has been that we have always obtained only the best results from Ross units", states Baldwin-Lima-Hamilton Corp. "We are quality equipment manufacturers, and therefore, whenever it is economically possible, include the best auxiliary equip-

ment available. This is usually Ross with regard to heat exchangers."

**VOICING SIMILAR REASONS** for Ross Exchanger selection, numerous other prime equipment builders regularly install these compact units on engines, compressors, turbines, reduction gears, speed increasers and torque converters . . . to cool lube oil, jacket water, air and hydraulic fluid.

**TOP-RATED** for ruggedness and thermal efficiency, Ross Exchangers are pre-engineered and fully standardized in a wide range of sizes to meet your specific requirements.

**IF YOU HAVE ANY HEAT TRANSFER PROBLEMS**, involving any type of heat transfer equipment, it will pay you to learn more about Ross. For detailed information, request Bulletins 2.1K5 and 1.1K6. American-Standard\*, Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto 4, Ont.

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INDUSTRIAL DIVISION

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**8500 H.P.**

*World's Most Powerful Towboat...*

*The* **UNITED STATES**



Quadruple Screw  
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Bunker C Fuel  
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designed and built for  
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Yards at:  
ST. LOUIS, MO.  
PADUCAH, KY.

## SPICER 4-SPEED AUXILIARY TRANSMISSION



## A deep underdrive *plus* a splitter for a faster pull up any grade

Now . . . with the Spicer 4-speed auxiliary transmission . . . you can equip your vehicles with the right ratio for every grade, whether on or off the highway.

In the same dual-purpose gearbox, there's a deep underdrive — for added pulling power — and a splitter ratio that speeds up the long pull. As a further advantage, the use of the splitter gear avoids engine lugging under almost any condition and makes it easier to keep engine RPM in the most efficient range for greater fuel economy.

For convenience in gearing up, the Spicer 4-

speed auxiliary is directly interchangeable with present 3-speed auxiliary transmissions. Companion flanges, drive shaft length and shift lever controls can all remain the same.

As an added option, the 4-speed transmission is offered with a top-mounted power take-off capable of transmitting full engine torque. Or, where lightweight design is desired, you can order the Spicer 4-speed transmission with an aluminum case . . . saving 80 lbs. of weight.

For further specifications, write the Dana Corporation, Toledo 1, Ohio, and mention the vehicle you're planning to gear up.



### DANA CORPORATION • Toledo 1, Ohio

#### DANA PRODUCTS Serve Many Fields:

**AUTOMOTIVE:** Transmissions, Universal Joints, Propeller Shafts, Axles, Power-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.  
**INDUSTRIAL VEHICLES AND EQUIPMENT:** Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.  
**AVIATION:** Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

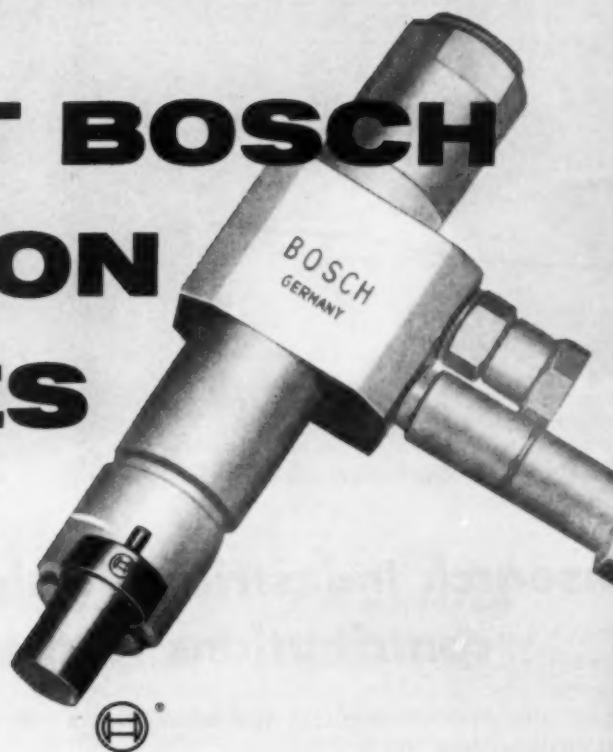
**RAILROAD:** Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts, Traction Motor Drives, Forgings, Stampings.

**AGRICULTURE:** Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

**MARINE:** Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Ltd., Merriton, Ont.

# 6 REASONS WHY IT PAYS TO STANDARDIZE ON ROBERT BOSCH INJECTION NOZZLES



© Reg. U. S. Pat. Off. ROBERT BOSCH GMBH Stuttgart

**1:** Leadership: ROBERT BOSCH Fuel Injection Equipment made the high-speed diesel engine practicable.

**2:** Consistent quality: Unmatched record of performance on literally millions of engines.

**3:** Widest selection: ROBERT BOSCH

offers the most complete line of nozzles available.

**4:** Service everywhere: Not only nation-wide, but world-wide.

**5:** Standard equipment: Leading gasoline and diesel engine manufacturers

here and abroad use ROBERT BOSCH equipment for their most advanced designs.

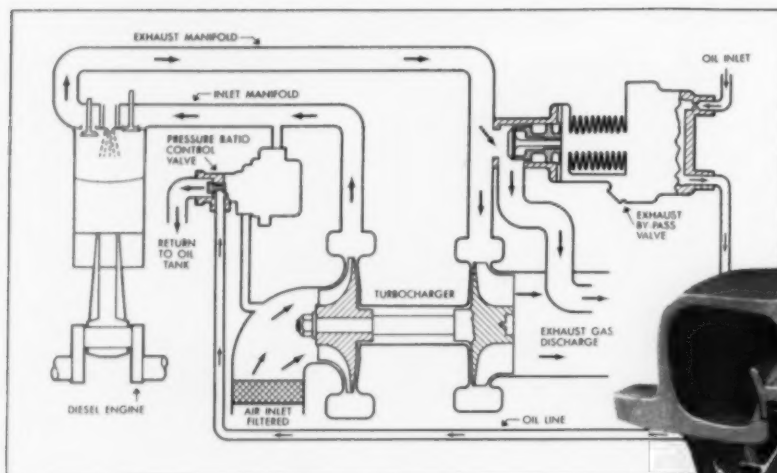
**6:** Higher quality at lower price: Sets new standards of long-life efficiency—yet actually is priced lower.

## **ROBERT BOSCH CORPORATION**

40-25 Crescent St., Long Island City 1, N.Y. 225 Seventh St., San Francisco 3, Calif.



# Most significant advances in turbocharging



*Pressure ratio  
control valve*



*Exhaust by-pass valve*



## ***AiResearch Industrial Division has made these vital contributions to the diesel industry***

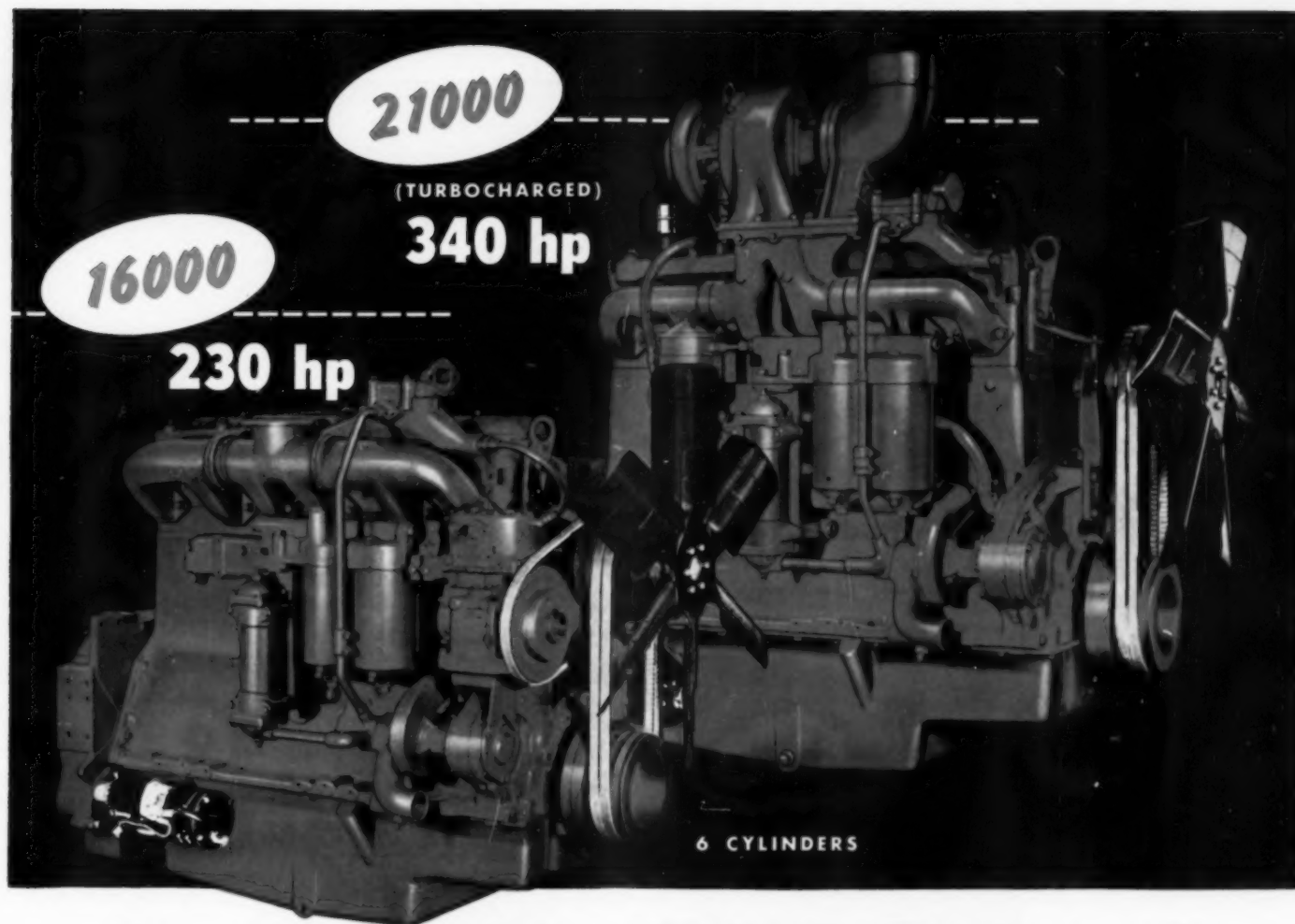
- provides the most economical turbocharging of diesel engines 50 to 700 H.P. . . .
- designed and manufactured the first successful air-cooled turbocharger . . .
- built the first pressure-ratio control system to keep the turbocharger operating at peak efficiency continuously . . .
- developed the "free vortex" principle to replace the vaned nozzle, substantially decreasing the cost of small turbochargers . . .
- uses compressors with exceptionally broad characteristics to give best efficiency over a wide range of engine operation . . .
- has delivered more than 20,000 turbochargers in the last five years . . .
- currently turbocharges more than six million horsepower in diesel equipment . . .
- sells turbochargers and turbocharger control systems to 21 major engine manufacturers .  
Your inquiries are invited.



**AiResearch Industrial Division**

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



## 2 NEW DIESELS THAT GIVE YOU...

### More Horsepower

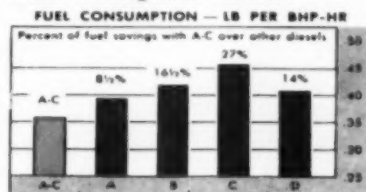
With 340 hp in the turbocharged 21000 and 230 hp in the 16000, you have the power to operate smoothly under extreme load conditions.

### More Torque

... throughout the operating range of speeds. Torque is consistently high ... provides the "umph" to do the job. Walks into and *through* heavy loads.

### Greater Fuel Economy

This chart compares fuel economy of the new Allis-Chalmers engines to others in their horsepower class. Economy like this gives you as much as from 1 to 2½ hours of extra production a day doing the same kind of work — using even less fuel.



### Clean Exhaust

These diesels have a new combustion system that provides *thorough* mixing of air and fuel for complete combustion. Fuel makes horsepower — not smoke!

### Clean Design

Modern engineering means greater dependability, less maintenance, easy installation. To further simplify servicing, there is 98 percent interchangeability of parts between the Allis-Chalmers 16000 and 21000 engines.

Let your Allis-Chalmers dealer show you the many other features that put the *profit* in performance. Write for FREE new 16-page bulletin BU-540. Allis-Chalmers, Milwaukee 1, Wisconsin

# ALLIS-CHALMERS

POWER FOR A GROWING WORLD



BE-13

# NOW the

## R-1160 ROADRANGER TRANSMISSION

**designed specifically  
for earthmoving and  
construction equipment**



The Fuller 9-speed semi-automatic R-1160 ROADRANGER Transmission is engineered for tractors and trucks equipped with engines of up to 1160 cubic inches piston displacement. An outgrowth of Fuller's highly-successful Model R-1150 ROADRANGER, the R-1160 is designed to handle up to 800 lbs./ft. of engine torque.

Featuring higher capacity and long wear life, the newest ROADRANGER is built to give fast work cycles, low fuel

consumption, longer engine life, less down time, reduced operator fatigue ... and greater profits.

Standard on the R-1160 ROADRANGER is Fuller's Air Powered Countershaft Inertia Brake, which provides quick up-shifts without double-clutching simply by pressing a button. Also standard is the Fuller Pressurized Filtration System, whereby gear oil is circulated by a pump through a filter which removes me-

tallic particles and road grit from the lubricant.

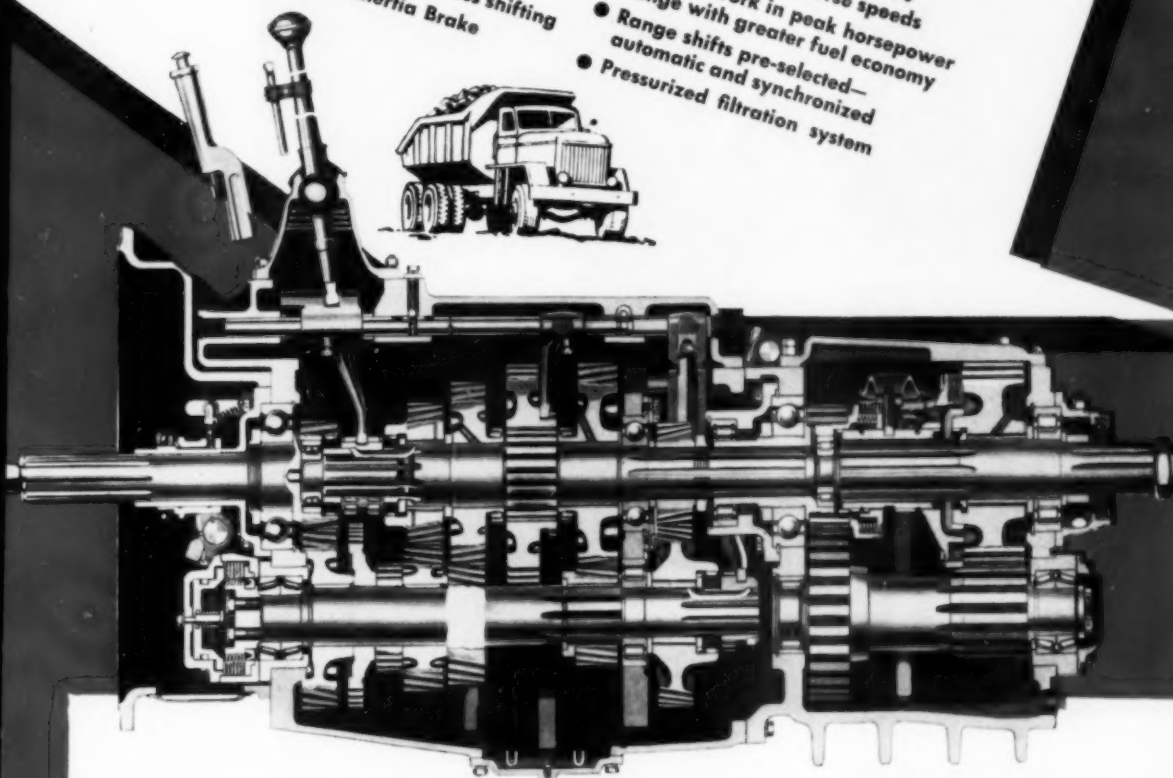
To increase the capacity of the R-1150, Fuller widened the faces and coarsened the pitch of auxiliary drive and reduction gears. Accompanying this change is an increase in synchronizer capacity, and a new auxiliary case of greater section and length accommodates the larger gears. All front section yokes except the third and fourth are clamped to the bar.



## THE R-1160

### PROVIDES THESE ADVANTAGES

- No gear splitting—9 selective gear ratios are evenly and progressively spaced
- Easier, quicker shifts—38% steps between ratios
- Less driver fatigue— $\frac{1}{3}$  less shifting
- Countershaft Inertia Brake
- One shift lever controls all 9 forward and 2 reverse speeds
- Engines work in peak horsepower range with greater fuel economy
- Range shifts pre-selected—automatic and synchronized
- Pressurized filtration system



## VITAL STATISTICS

GEAR	RATIOS	% STEP	
Ninth	.75	33	HIGH RANGE
Eighth	1.00	39	
Seventh	1.39	40	
Sixth	1.94	34	
Fifth	2.59	34	
RANGE SHIFT		34	
Fourth	3.48	39	LOW RANGE
Third	4.84	40	
Second	6.76	34	
First	9.02	34	
Reverse	3.31	High Range	
Reverse	11.53	Low Range	

WEIGHT: 1133 lbs. LENGTH: 44 $\frac{11}{16}$ " OIL CAPACITY: 35 pts.; with filter, 38 pts.  
CLUTCH HOUSING SIZE: SAE No. 1 APPROXIMATE ENGINE SIZE, CU. IN.: 1160

# FULLER

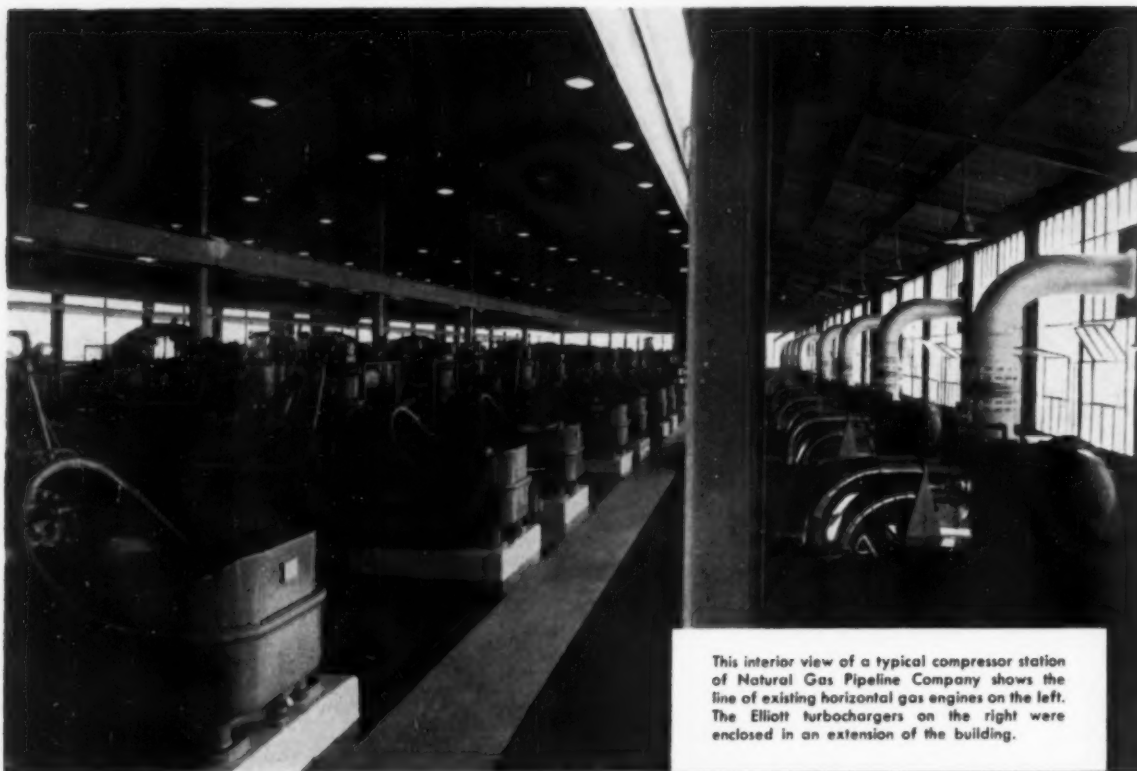
TRANSMISSION DIVISION  
MANUFACTURING COMPANY  
KALAMAZOO, MICHIGAN

Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 4, Cal. and Southwest Dist. Office, Tulsa 3, Okla.  
Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

# ELLIOTT TURBOCHARGERS

help increase pipeline pumping capacity **40%**



This interior view of a typical compressor station of Natural Gas Pipeline Company shows the line of existing horizontal gas engines on the left. The Elliott turbochargers on the right were enclosed in an extension of the building.

Natural Gas Pipeline Company of America was faced with the problem of increasing throughput capacity of existing pipelines. The economical solution of the problem included the application of Elliott turbochargers to 72 existing horizontal engines in nine compressor stations along the line from Texas to Illinois.

Engines originally designed to develop 1250 hp are producing 1800 hp when turbocharged. Benefits, in addition to more than 40 per cent power increase, include lower fuel consumption per horsepower and savings in operating and maintenance costs.

**ELLIOTT Company**

Turbocharger Department  
Jeannette, Pa.

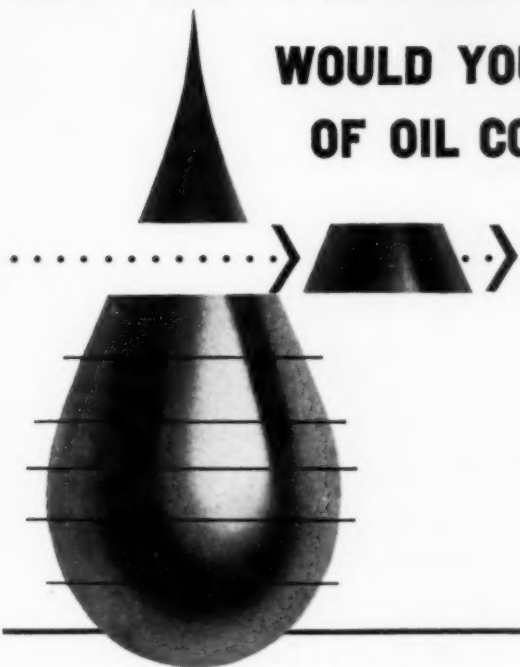


No other turbocharger manufacturer has as much experience covering the whole field of turbocharged engines as has Elliott Company.

# ENGINEERING

NEWS YOU CAN USE ABOUT ENGINE AND COMPRESSOR PERFORMANCE

## WOULD YOU BELIEVE THAT ONE DROP OF OIL COULD BE THIS IMPORTANT?

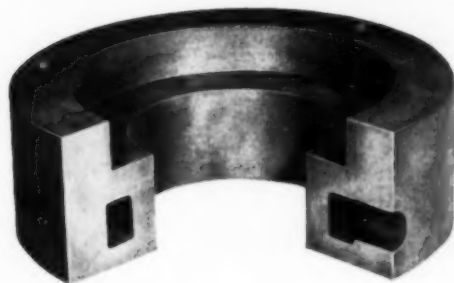


Take a 12 cylinder, 2,000 HP, 330 RPM engine... let just **ONE-EIGHTH OF A DROP** of additional oil per stroke be used in each cylinder and here's what will happen: your oil consumption rate will increase from 8000 BHP hours per gallon to 2000!

And that's the big reason Cook rings save you money. Like other oil control rings, Cook rings meter oil and properly spread it, but Cook rings do this in addition: *they prevent excessive use of oil!*

Don't just get oil wiper rings... get Cook *engineered* conformable oil wiper rings, the most copied oil control rings in the world!

## KEEPS PACKING COOL ... AND IT'S LEAK-PROOF!



Cook's new leak-proof packing cup features circulating water completely *inside of the cup itself*... eliminates any possibility of leakage, corrosion or contamination of the material under compression. These are big advantages for all applications—and are naturally of even greater importance on non-lubricated service.

## WRITE FOR COOK'S NEW PISTON RING CATALOG

Sixteen-page catalog just off the press. Describes complete line of piston rings manufactured by C. Lee Cook Company, also the special rings of the Airtomics Division. For your free copy, write: C. Lee Cook Company, 940 South 8th Street, Louisville 3, Kentucky.



**C. LEE**

**COOK**

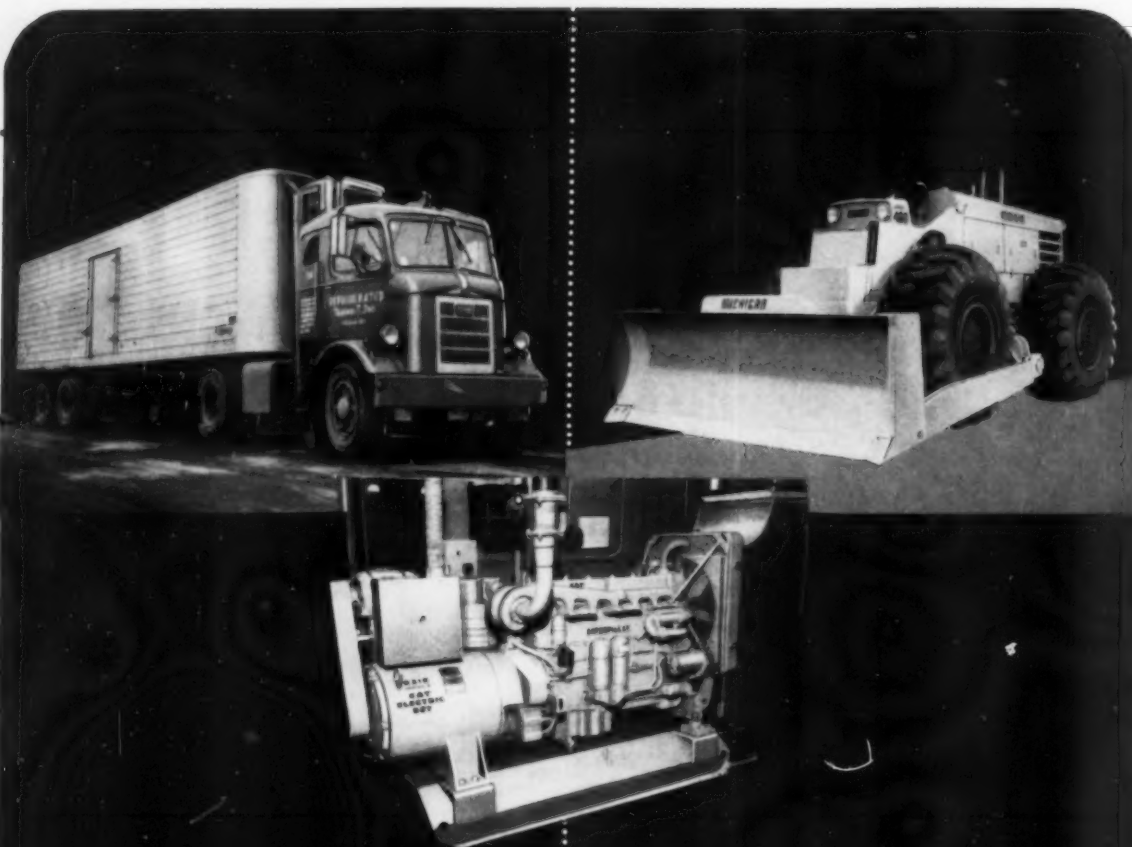
COMPANY

Division of Dover Corporation

Rings and Packings Since 1888







**You find Schwitzer Turbos  
where the world's work is done**

**SCHWITZER**  
C O R P O R A T I O N  
INDIANAPOLIS, INDIANA

**PRODUCTS WITH A NEW APPROACH**

- Turbochargers ■ Superchargers ■ Fan Blades ■ Fan Drives
- Accessory Drives ■ Vibration Dampers ■ Air Starting Motors
- Water Pumps ■ Oil Pumps ■ Shaft Seals

# HONEYWELL

## DAMPERS—SHUTTERS

*...built to your specifications for accurate, dependable air flow control*

Get the *exact* shutter, damper or louver you need from Honeywell. Specify any style or type, any blade materials and setting, any edging materials, any operator-mounting arrangement. Louver, round or right angle mixing types available for pneumatic, electric or manual operation. Whatever your needs, you're assured smooth, uniform performance when you specify custom-made Honeywell shutters for dependable air flow control.



## ... AND SHUTTER OPERATORS

*...ruggedly built for precise positioning—electric or pneumatic*

There's an electric or pneumatic motor for every shutter application in the all-inclusive Honeywell line. Two or more motors can be operated in sequence or in unison. Motors can operate two or more shutter sections, provided the combined shutter load doesn't exceed motor capacity.

Available for two-position or proportioning control.

Call your nearby Honeywell field engineer for a discussion of your needs. He's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

### PNEUMATIC MOTORS



**Grad-U-Motor** shutter motor. Three sizes, for operating up to 48 sq. ft. of shutter area.

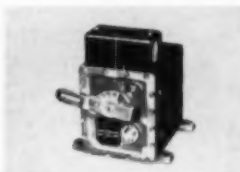


Heavy-duty, piston type **Grad-U-Motor**. For operating up to 96 sq. ft. of shutter area.



**Air-O-Motor** diaphragm motor. Three sizes, for operating up to 310 sq. ft. of shutter area.

### ELECTRIC MOTORS



**Modutrol** motor operates up to 70 sq. ft. of shutter area.



**Actionator** operates up to 100 sq. ft. of shutter area.



**Series 831E Industrial Motor** operates up to 370 sq. ft. of shutter area.

# Honeywell



*First in Control*

# SLUDGE *situation* gets a clean-up



**STANODIESEL Oil M**  
helps keep  
diesels clean  
and  
running smoothly  
at Princeton,  
Missouri

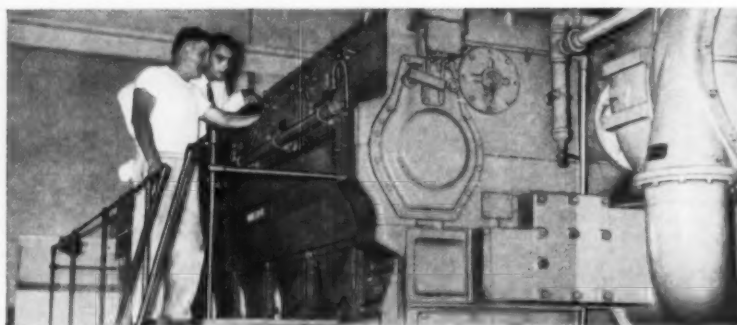
**The situation:** Consumer Public Service Company, Princeton, Missouri, has three diesels in service—a 225 hp unit installed in 1951, a 1,083 hp unit installed in 1954 and a 1,440 hp unit installed in 1956. In previous equipment, sludging had been a problem, so when these units went into service, a heavy duty oil was recommended—STANODIESEL Oil M.

**What has happened:** The oil has been inspected regularly by a Standard Oil lubrication specialist. Samples are periodically removed for analysis at Standard's Whiting Indiana research laboratory. Analysis shows the oil to be in excellent condition. Since the 1,440 hp unit was started up in 1956, it has generated 1,672,200 kw hours of electricity.

**What you can do:** Find out more about how STANODIESEL Oil M can deliver service in your plant. Ask for more information from the Standard Oil lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

## *Quick facts about* STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.



Darrel McCormick, Standard Oil lubrication specialist and William Rutledge, plant superintendent, inspect 1,440 hp diesel in Princeton, Missouri plant. Darrel is an experienced hand at this work. He has an engineering degree from Vanderbilt University plus four years' experience in industrial lubrication work at Standard Oil. He has also completed the Standard Oil Sales Engineering School.



*You expect more from* **STANDARD** *and you get it!*



# ALLIS-CHALMERS' NEW 230-340 HP DIESELS

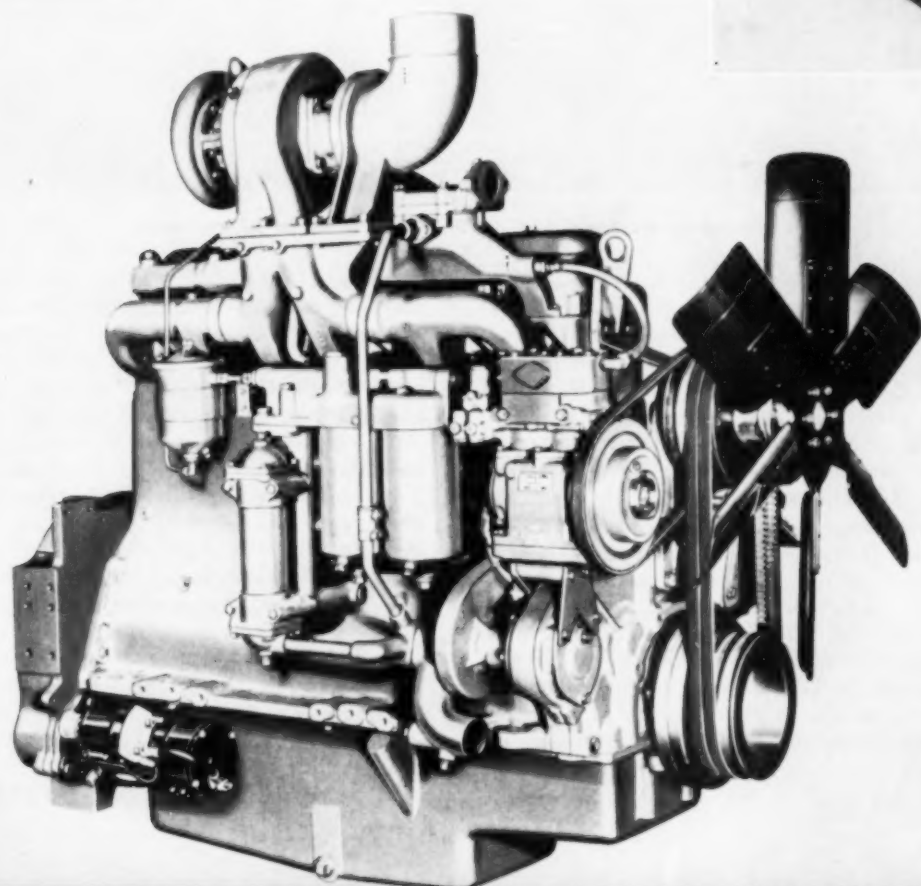
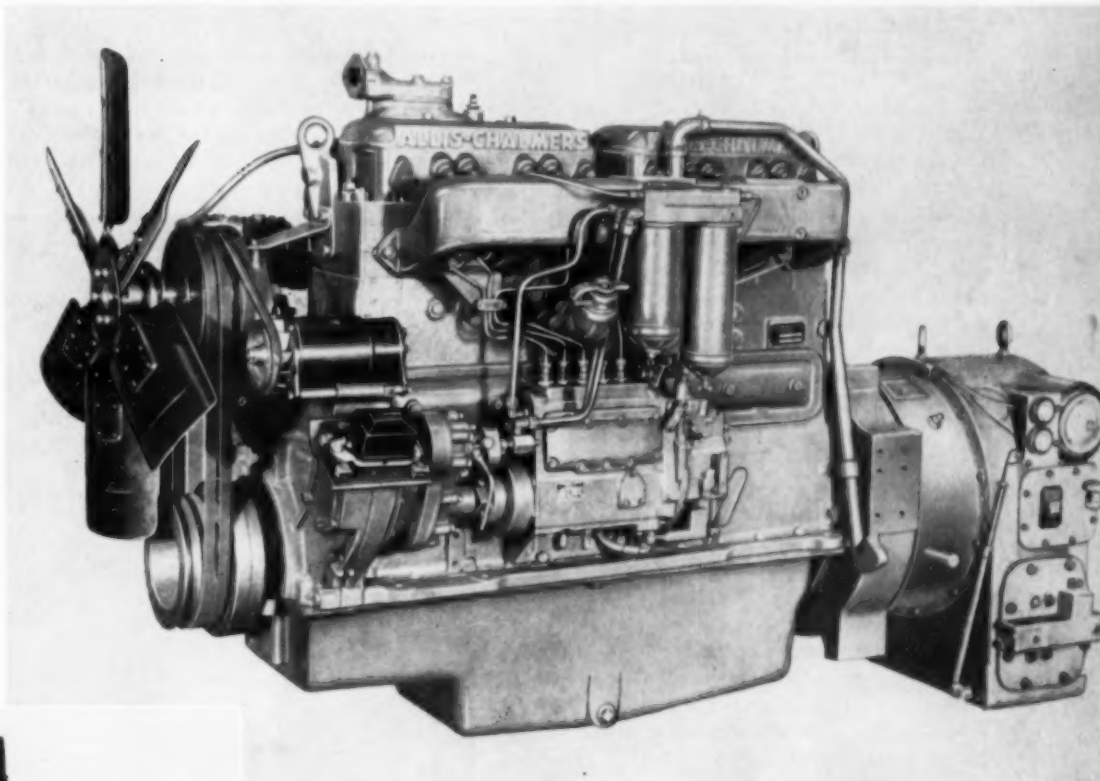
By ROBERT E. SCHULZ

**H**ARVEY, Illinois—Here at the manufacturing headquarters of the Engine and Material Handling Division of Allis-Chalmers, two new engines are on the production line—engines for which company officials are enthusiastically predicting a wide acceptance because of their versatility, marked fuel economy and sound operating characteristics. Based on my visit here, there are many good reasons why this prediction is well founded. Designed with an open-type combustion chamber, the engines are of the four-cycle type with six cylinders of  $5\frac{1}{4}$  in. bore,  $6\frac{1}{2}$  in. stroke, with 844 cu. in. displacement. Both engines are rated at 2,000 rpm with the turbo-charged version designated 21,000 developing 340 bhp and the naturally aspirated model 16,000 producing 230 bhp. Completely equipped power units have ratings for heavy duty continuous service at 215 and 160 hp, respectively.

Development of the new engines headed into an accelerated program in the fall of 1953 under the direction of Director of Engineering, A. F. Ochtman. Working closely with Ochtman in all phases was Hans Wittek, Director of Research and C. N. Guerasinoff, Chief Engineer. This team, with the help of Burt Clark, Engine Product Manager and liaison between Allis-Chalmers Milwaukee and Harvey works, made a complete study of existing engine models in terms of the industry's present and future requirements and decided that a totally new design was necessary. Moreover, the analysis dictated that the new engines replace

five existing models. In establishing further design goals, it was decided to use an open type combustion chamber which markedly departs from the company's traditional energy cell type. Fuel consumption in the area of .36 lbs./bhp was targeted as was the desire to retain moderate peak pressures and a low rate of pressure rise, a

feature of current engines. The engineering team also agreed that engine weight would not be compromised in the interest of stamina and operating reliability. It is interesting to observe how the Allis-Chalmers engineers, working under this umbrella, have designed and built an engine to these original requirements.

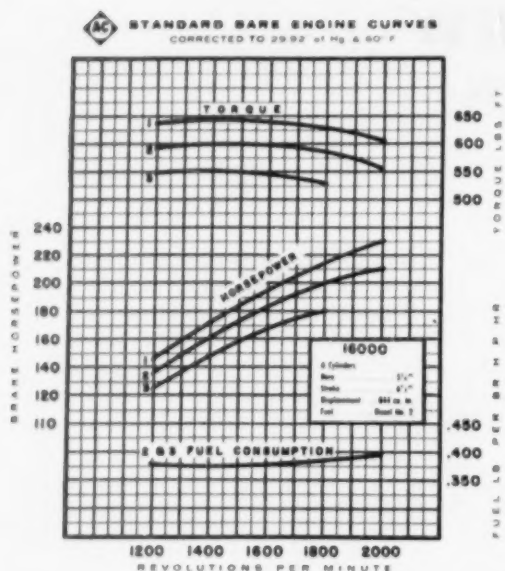


Here is the new 230 bhp Allis-Chalmers 16,000 engine equipped with Clark 17 CK torque converter. American Bosch BB fuel injection pumps are standard as is Delco-Remy electrical equipment.

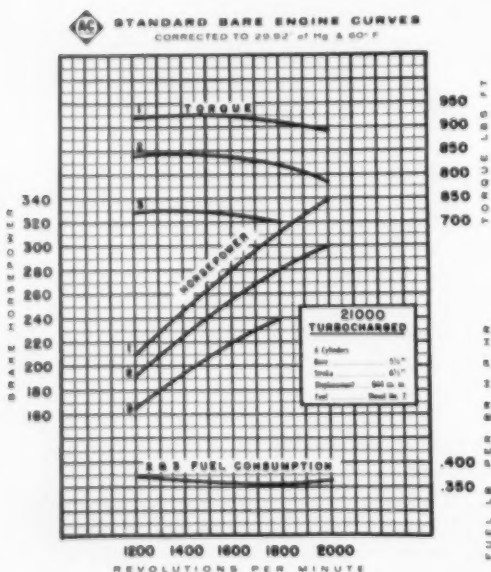
Here is the off-highway model of the 340 bhp Allis-Chalmers 21,000 diesel. Garrett AiResearch turbochargers are standard on this series. Note Bendix Westinghouse compressor.

Coincident with this engine development at Harvey has been a substantial modernization and new building-program. Key part of this program has been the construction of a new, two story engineering center and adjacent 22 engine dynamometer testing structure. The two new buildings, together with other Allis-Chalmers research gives the company, facilities among the finest in the industry. This entire engineering, research and testing program will be described in detail in a forthcoming issue of DIESEL PROGRESS.

In announcing the new 16,000 and 21,000 engines, Allis-Chalmers has taken a significant step in broadening the application range of their line.

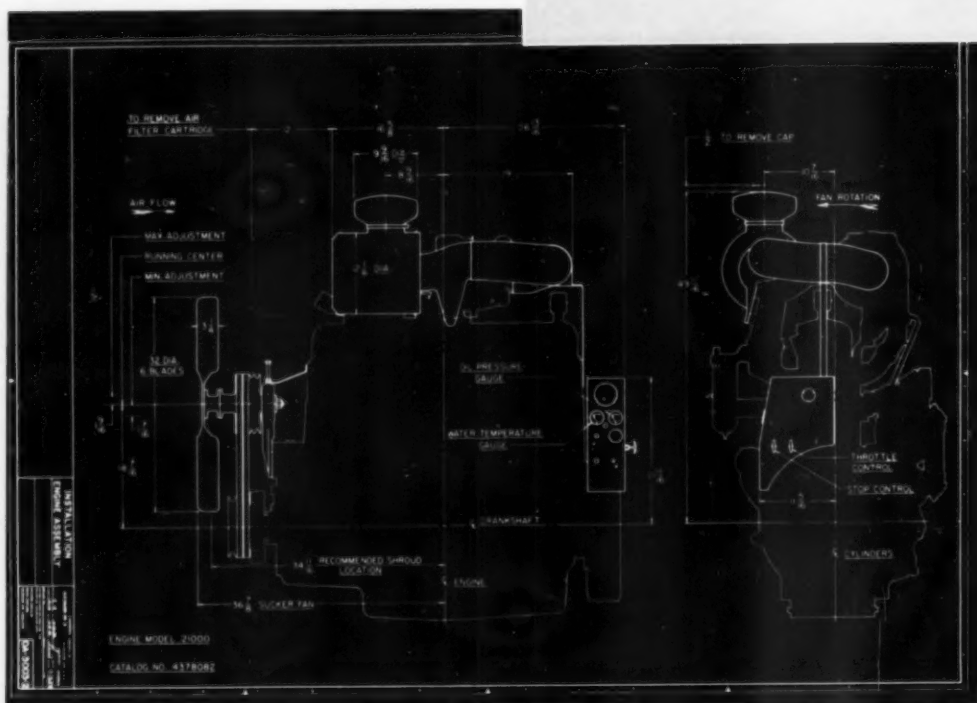
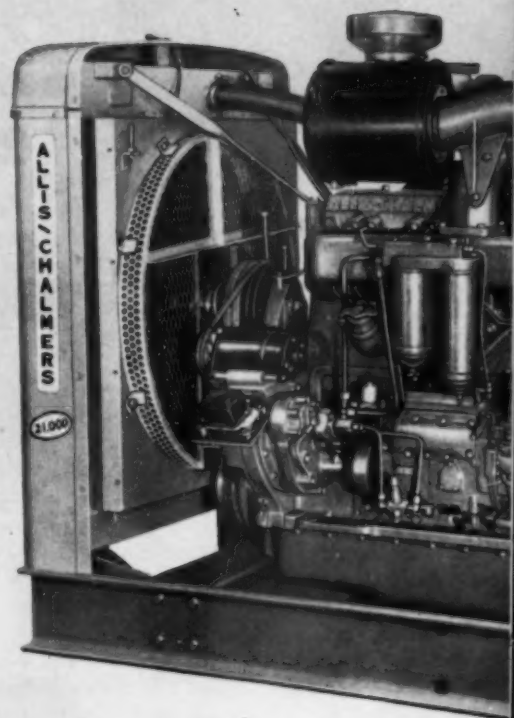


The new engines have been brought through an exhaustive research and testing program beginning with many months of experimental work on a single cylinder engine, through prototype units to the final designs. The final test program was divided into two distinct phases with work carried on simultaneously, (1) endurance testing at the Harvey and Springfield works and (2) field application testing in tractors at the Springfield proving grounds and in motor scrapers at the Cedar Rapids test grounds. A number of engines were assigned to the endurance phase. This is an interesting program to watch for in an established, automatic cycle of starts and stops with widely varying loads, the engines are subjected to simulated, rugged field operating conditions. In this segment of the program, the engines have recorded well over 60,000 hrs. of operation. The engines tested in Springfield and Cedar Rapids performed to the complete satisfaction of Allis-Chalmers officials and the new 21,000 and 16,000 engines are now being used as standard power on the new line of Allis-Chalmers HD-21 and HD-16 crawler tractors which have been out in service now for 6 months. In reviewing the endurance and field test records with the engineering staff at Harvey,



it appears that the new engines have a substantial potential and are the finest engineering achievements in diesels to date by Allis-Chalmers.

As noted previously, the new engines have an open chamber design totally new to Allis-Chalmers and in many ways unique in the industry. A glance at the cross section shows this design with the top of the piston deeply recessed and then coming to a point in the center. With this design, Allis-Chalmers engineers have attained what they term a toroidal action in the combustion space. This action, in part, is achieved by a mask on the inlet valves which causes a high velocity, rotating motion of the incoming air in the cylinder. This rotating air mass is then caused to take a revolving motion as the air at the periphery of the cylinder is squished to the center as the piston reaches top center. Into this highly turbulent, doughnut shaped air mass, revolving and rotating simultaneously, the fuel is injected. According to Allis-Chalmers engineers, this toroidal action evenly distributes the fuel particles so that exceptional even burning is achieved which re-



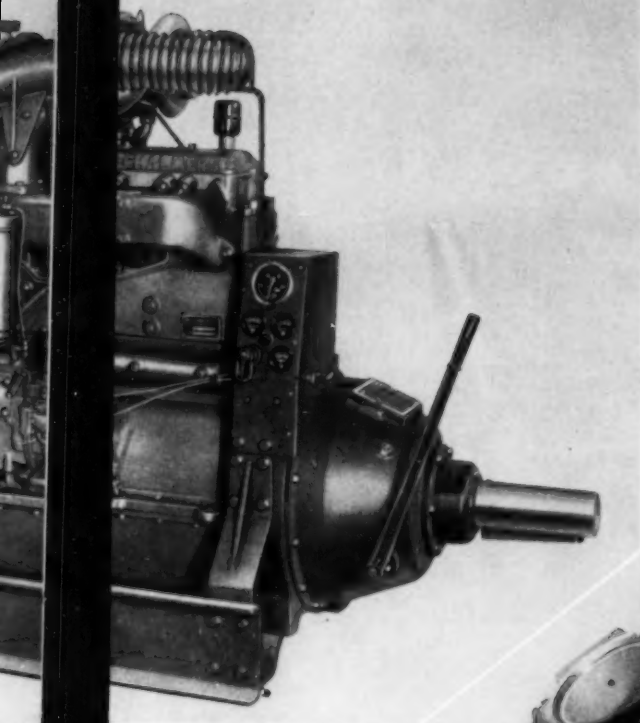
Dimensional drawing of the fan-to-flywheel Allis-Chalmers 21,000 engine.

sults in smooth power and excellent fuel economy. Pointing to the economy produced from these features is the fuel consumption rate on the curves illustrated. These fuel rates were recorded on a production line engine in test during my visit to Harvey. It's interesting to note at this point that the compression ratio of both the 16,000 and 21,000 engines is 14.5:1. The injection duration on the naturally aspirated engine is about 10-12 pump degrees and on the turbocharged unit, about 12-14 degrees. Bmep at the 340 hp rating is 160. In referring to the curves illustrated, the full power setting (1) represents the power available at full throttle for engines to be installed in off-highway rubber tired equipment, for stand-by service and similar applications. Intermittant duty (2) is the recommended power to be used for applications having varying loads and speeds with full

power being required for short periods. Continuous duty (3) is the recommended power to be used for driving sustained full loads for 24 hours per day operation. Torque of both engines, as evidenced in the curve, shows the rising characteristics desirable for construction machinery and other heavy duty applications. On those applications where high back up torque is desirable this can be achieved through easily made adjustments in the engine governor.

The new engine is designed with three valves, two inlet and one exhaust and their design is such to provide optimum performance over a wide range of operating conditions. All three valves take steel inserts. To achieve the required directional flow of air, the inlet valve is keyed and restrained from rotating. Double springs, oppositely





charged engines and it provides fuel under pressure of 2,500 psi to the injection nozzles. A five-hole nozzle is used on the 21,000 and a four-hole on the 16,000. The fuel oil filter is mounted on the intake manifold. The engine takes a built-in full flow lubricating oil filter and engine oil cooler. A torque converter heat exchanger, of the shell-and-tube type, runs the full length of the engine. A secondary lube oil filter is installed on the line going to the Garrett Air-Research turbocharger on the 21,000. Radiator type bypass cooling system is used on both engines with the water pump gear driven from the camshaft and provided with a

board bearings and as complete, self-contained generator sets with the 16,000 rated 125 kw and the 21,000 rated at 175 kw continuous. On all generator sets, a brushless generator will be used as built by Allis-Chalmers at its Norwood works incorporating a new Allis-Chalmers static magnetic-amplifier type of voltage regulator featuring exceptionally fast response and motor starting ability. The engines are also available for other power purposes and the company offers a wide variety of optional equipment.

Applications for the new engines other than in

21,000 open type power unit with Twin-Disc clutch power take-off.

Cross section through the cylinder of the new 16,000 engine.

New piston design showing deep recess. Top ring is set in Ni-Resist insert.

coiled, relieves stress on the valve stem. All of the valve seats are water cooled and the injection nozzle, set in a stainless steel sleeve, is also encompassed with water. The rocker arm assembly is of the button type using simple barrel type lifters so that the only load on the camshaft comes from the valve spring. Two cylinder heads are used. The top cover is easily removable for access to fuel injection nozzles and the rocker arms for valve adjustment.

The crankshaft for the new engines is fully counterweighted and is statically and dynamically balanced. It has seven main bearings with  $3\frac{3}{4}$  in. main journals and  $3\frac{1}{4}$  in. connecting rod journals. Connecting rods are precision balanced with an "I" section and are rifle-drilled. The piston pin is of the full-floating type and is held in place by a snap retainer. The pistons are heavy-duty, lightweight, aluminum alloy, cam-ground to insure perfect fit in the cylinder at operating temperatures. Each is fitted with five rings, three compression and two oil. The chrome faced top ring fits in a groove protected from wear by a Ni-Resist iron insert cast into the piston. The pistons travel in alloy iron cylinder liners of the wet type built with "O" ring seals at the bottom. The cylinder block, produced from high tensile alloy iron, is internally ribbed so that the stress is carried on the inside of the block through a column of iron.

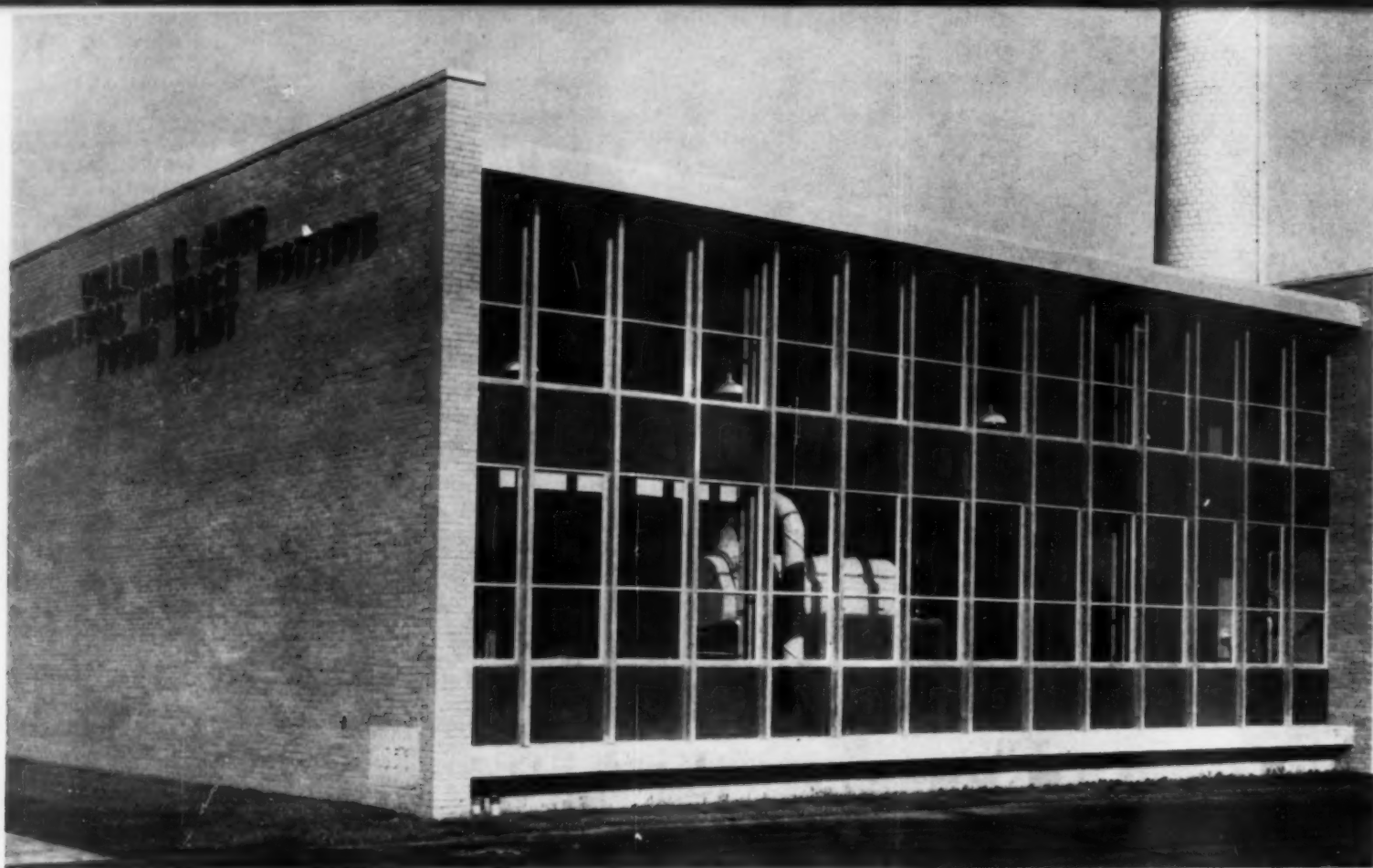
A model BB American Bosch fuel injection pump is used on both the turbocharged and non-turbo-

single floating, rotating seal. To maintain full engine cooling, water is directed by a water manifold to each cylinder. A 24 volt electrical system is standard on each engine with the starter, generator and regulator supplied by Delco-Remy. Air and hydraulic starters are available on both models as optional equipment.

An SAE #1 flywheel housing and flywheel is standard on both engines to accommodate Twin-Disc, Rockford or Spicer clutches and transmissions. The SAE #0 housing and flywheel is optionally available. Other than fan-to-flywheel engines, Allis-Chalmers makes the engines available as skid-mounted and housed power units with out-

generator sets and in other broad industrial types for pump, compressor and similar drives are numerous. In discussing markets, Burt Clark pointed to the off-highway area as holding the greatest immediate application, especially in rear and bottom dump haulers, scrapers and graders in addition to the new HD-21 and HD-16 crawler tractors. Commenting further, Clark stated, "From test application, it appears that the commercial marine market holds substantial potential and we are offering the engines with a complete set of optional gears. We are expecting considerable activity in the engine generator field where the all-Allis-Chalmers package units offer many design and performance features."





## 864 KW PLANT SERVES RESEARCH INSTITUTE

**Diesels Backstop Hydro Power and Insure  
Electrical Power for Laboratories, Classrooms,  
Residences at Chazy, New York**

**N**EAR the village of Chazy in northern New York, the new William H. Miner Agricultural Research Institute is striving to improve the farming methods of the region. In this latest benevolent project of The William H. Miner Foundation, everything has been provided to promote the success of the Institute—modern laboratories, classrooms and conference rooms, attractive residences for professors and students. To insure against interruption of activities through failure of power supply, Foundation engineers included a complete 864 kw diesel-electric plant with a pair of 625 hp Fairbanks-Morse opposed-piston engines as prime movers. Chazy was the boyhood home of William H. Miner and the region owes much to his progressive philanthropy. As far back as 1916, he built the Chazy Central Rural School providing modern elementary and high school facilities for 500 students. Replacing ten rural school districts, this was one of the pioneer central schools in state and nation. Ten years later he built the 330-bed Physician's Hospital in Plattsburgh, the county seat 17 miles south of Chazy. Mr. Miner's interest in agriculture was evidenced by his development of the fabulous 14,000-acre Heart's Delight Farm. His death in 1930 did not halt the work he had begun and projects were carried for-

ward by the Foundation under the direction of Albert P. Withall. Recent accomplishments included construction of a Nurses Residence adjoining Physicians Hospital in 1953 and a modern, well-equipped Industrial Arts and Homemaking Building at the Chazy School in 1956. Then, in 1957, came the dedication of the Miner Agricultural Research Institute. The Institute will conduct investigational work in laboratories and on an experimental farm and will provide a nine-and-a-half month course for teaching the latest scientific farming methods to young men and women of the area. The physical plant includes the main classroom and laboratory building, a large student dormitory, a director's residence, faculty residences, and the power house and pumping station. There is also an athletic field with spacious grandstand.

Power supply is a problem in Clinton County, northernmost county in New York State. Principal source of power has long been a series of river hydro plants but winter water shortages often have cut the supply of electricity far below normal demand. Thus, the City of Plattsburgh supplements hydro power with its municipal diesel plant, in which a Fairbanks-Morse opposed-piston engine is the newest and largest unit. Physicians Hospital



has its own F-M diesel standby. Another winter hazard in the north country is transmission line failure. In planning the Miner Agricultural Research Institute, therefore, Foundation engineers were careful to include a heavy-duty diesel plant to back-stop normal hydro power. It was decided that the plant should be complete in every detail and capable of long-term efficient operation. Further, it was decided to build a plant large enough not only to carry the full Institute load but also the nearby Chazy Central Rural School. The engines chosen for this plant were two identical model 38D8-1½ Fairbanks-Morse two-cycle opposed-piston diesels. Each has five cylinders, 8-1½-in. bore and 10-in. stroke, and is rated 625 hp. Each engine drives directly a 540 kva, 432 kw Fairbanks-Morse alternator with 7½ kw direct-connected exciter.

Since this plant will be most needed when other

This modern power plant with its two Fairbanks-Morse diesels insures an uninterrupted power supply to the new William H. Miner Agricultural Research Institute.

Most important structure in the Miner Agricultural Research Institute is this attractive, modern building which holds the laboratories, class rooms and conference rooms.

Grouped on an attractive campus (nearing completion in this view) are the modern buildings of the Research Institute.



AGRICULTURAL RESEARCH BUILDING CHAZY, NEW YORK

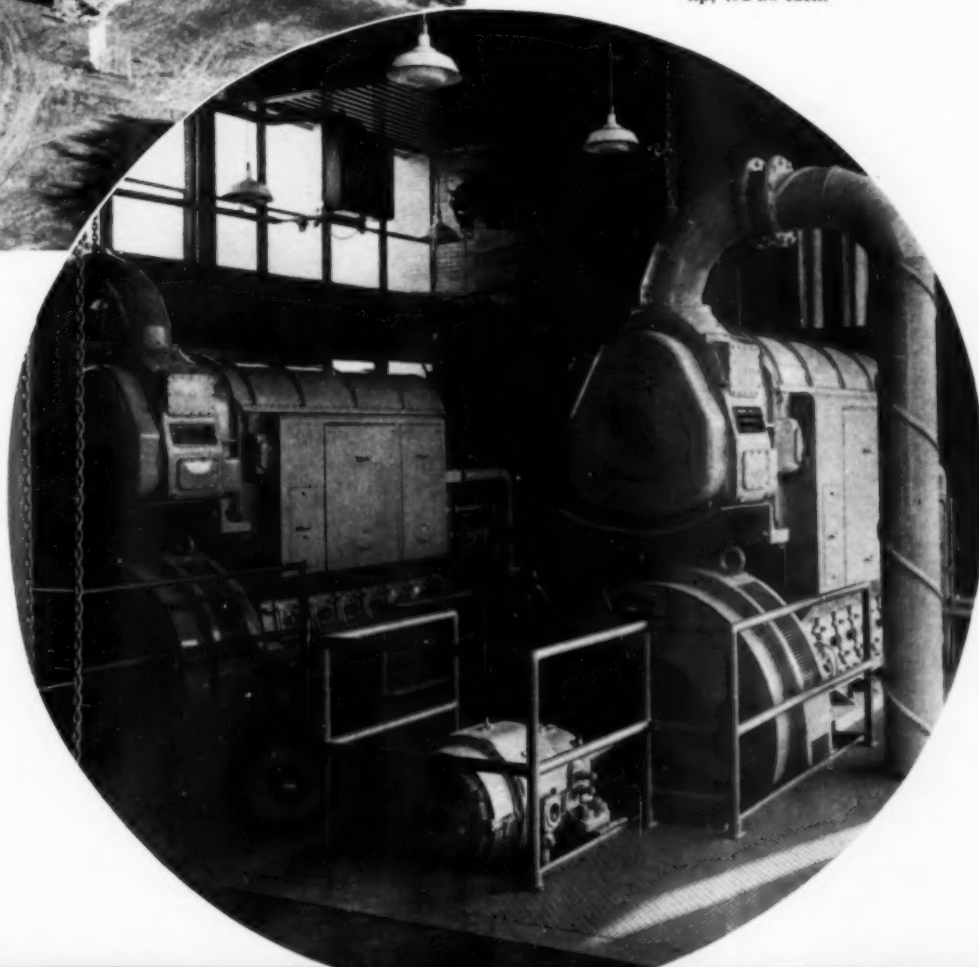
power sources have been knocked out, it was designed to be wholly self-sufficient. If the hydro power supply fails, a small battery-started diesel-generator starts up automatically. This unit is a 6 kw model 45B4-1/8 Fairbanks-Morse diesel-generator set which provides enough power to run the motor-driven starting air compressor and the pre-lube pumps enabling the operator to start one of the big diesels in a hurry. The little unit also provides current for emergency lighting. Every precaution has been taken to insure trouble-free operation. Each of the principal engines is served

Prime movers in the Institute power plant are two identical model 38DB-1/8 Fairbanks-Morse engines rated 625 hp, 432 kw each.

by an evaporative cooler with circuits for jacket water and lubricating oil. An adequate supply of raw water is assured by a pair of 10,000 gal. storage tanks which are kept full by a motor-driven centrifugal pump at a nearby spring. Even if the pump fails, there is enough water to keep the plant going for a full day. Automatic temperature regulating valves keep jacket water and lube temperature at prescribed levels. Lube oil is cleaned continuously by full-flow strainers and bypass cartridge-type filters. The well-instrumented switchboard includes two identical engine gauge and alarm panels with multi-point exhaust pyrometers, fuel tank level meters, temperature and pressure gauges, and alarm systems with horns and indicator lights. Intake air for the diesels is drawn through oil bath filters and intake silencers. Another example of the meticulous care taken in design of this plant is the provision not only of exhaust silencers but also a tall brick stack to insure that gases vent high in the air. In keeping with the architecture of the Institute, the power plant is an attractive modern structure of brick with stone trim. One complete wall is glass and colorful panels. William H. Miner was a talented inventor, a man who designed equipment for efficient, heavy-duty service. The Foundation that bears his name and carries on his work builds solidly for unfailing attainment of its long-range objectives.

#### Principal Equipment List

Engines	Fairbanks-Morse
Alternators	Fairbanks-Morse
Governors	Woodward
Pyrometers	Alnor
Exhaust silencers	Maxim
Air intake silencers	Maxim
Air intake filter	American
Air compressors	Quincy
Alarm and gauge panels	Marquette Electric
Fuel oil meters	Niagara
Temperature regulating valves	Amot
Lube oil strainers	Air-Maze
Lube oil filters	Hilco
Pre-lube pumps	Roper
Switchboard	Marquette





# M/V UNITED STATES

**Propelled by Four Cooper-Bessemer Heavy Fuel Oil Burning Diesels, New 180 Ft. Towboat Is Most Powerful Ever Built for Inland River Service; Veteran Rivermen See Vessel As Start of New Era in River Transportation.**

By ROBERT E. SCHULZ

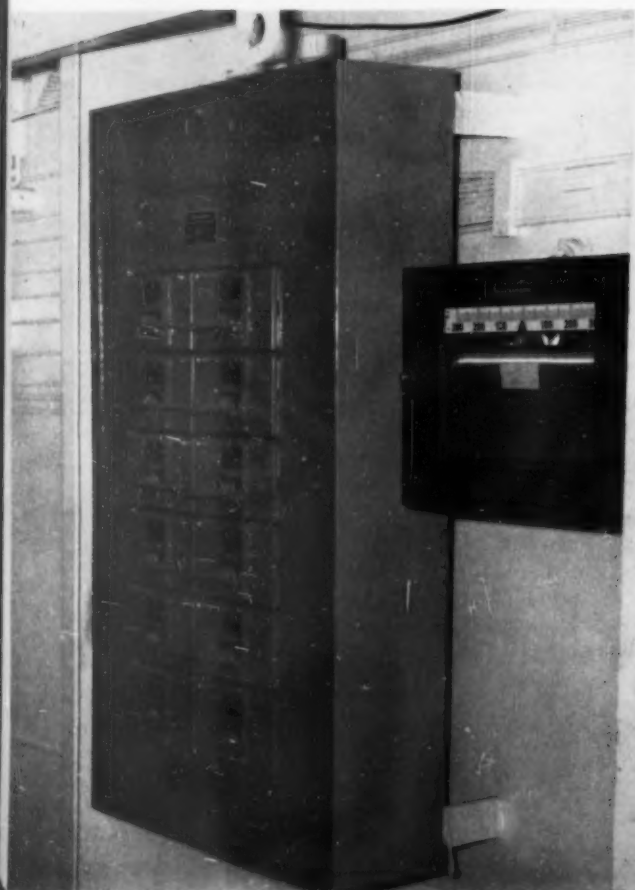
**S**T. LOUIS, Missouri—December 10, 1958—A giant on the waterways, the M/V *United States* was christened here today in a ceremony that marked a milestone in the progress of river transportation. Built by St. Louis Shipbuilding & Steel Co. at a cost of \$1,700,000, the vessel enters the service of Federal Barge Lines, Inc. on the lower Mississippi between St. Louis and New Orleans. Largest and most powerful towboat ever built to operate on the inland waters, the vessel also marks a significant milestone for St. Louis Ship, which this year is observing the 25th anniversary of its founding. Commenting on this, A. R. Parsons, president of the company, stated, "... I am certain the *United States* is only the first of a whole new class of high-powered river craft that will handle larger tows more efficiently and more dependably." Other veteran rivermen at the waterfront today were quick to concur with Parsons and some indicated that this boat heralds a new era in river transportation.

With the temperature well below freezing and a sharp wind whipping in from across the river, Mrs. Louis S. Rothschild, wife of the former Un-

dersecretary of Commerce for Transportation, as sponsor of the giant towboat, broke a bottle of champagne over its capstan as part of the ceremonies marking its entry into the expanding barge transportation fleet. The former Undersecretary was also chairman of the government Inland Waterways Corp. in 1953, when Federal Barge Lines was sold by the government to St. Louis Ship. According to H. T. Pott, chairman of both St. Louis Ship and FBL, the 8500 hp *United States* "represents what may be expected to be for a period of years, the ultimate in towboat size and power for practical maximum efficiency in operation." The vessel, 180 ft. by 58 ft. wide, and displacing 1760 tons at an operating draft of 8½ ft., will be capable of pushing a tow of 40 barges carrying a total of 40,000 tons of cargo—equivalent to the capacity of 10 freight trains of 100 cars each. A tow of this size will be one-third of a mile long and nearly six acres in area. Depending on the

The Brown Elektronik recording tachometers supplied by Minneapolis Honeywell are installed on the aft engine room bulkhead.

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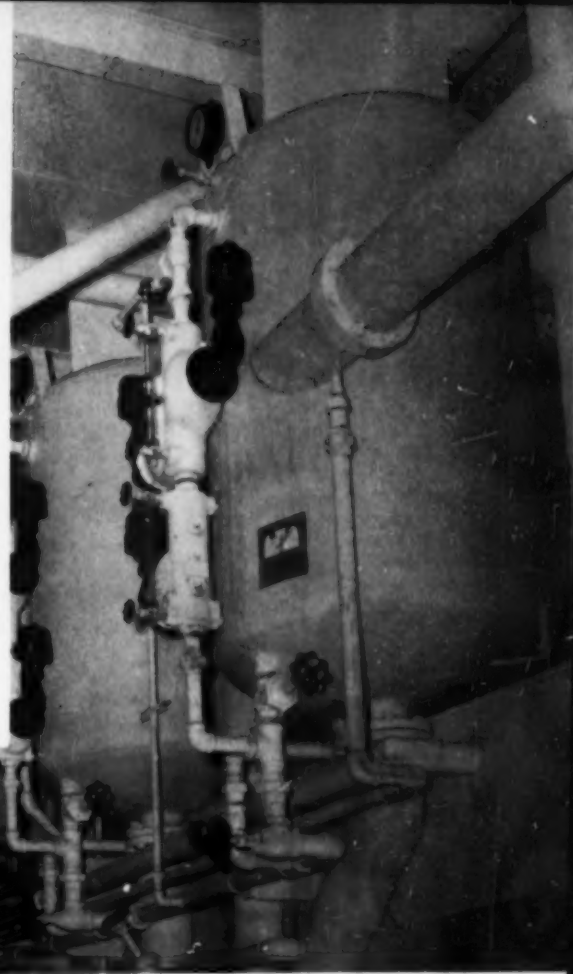




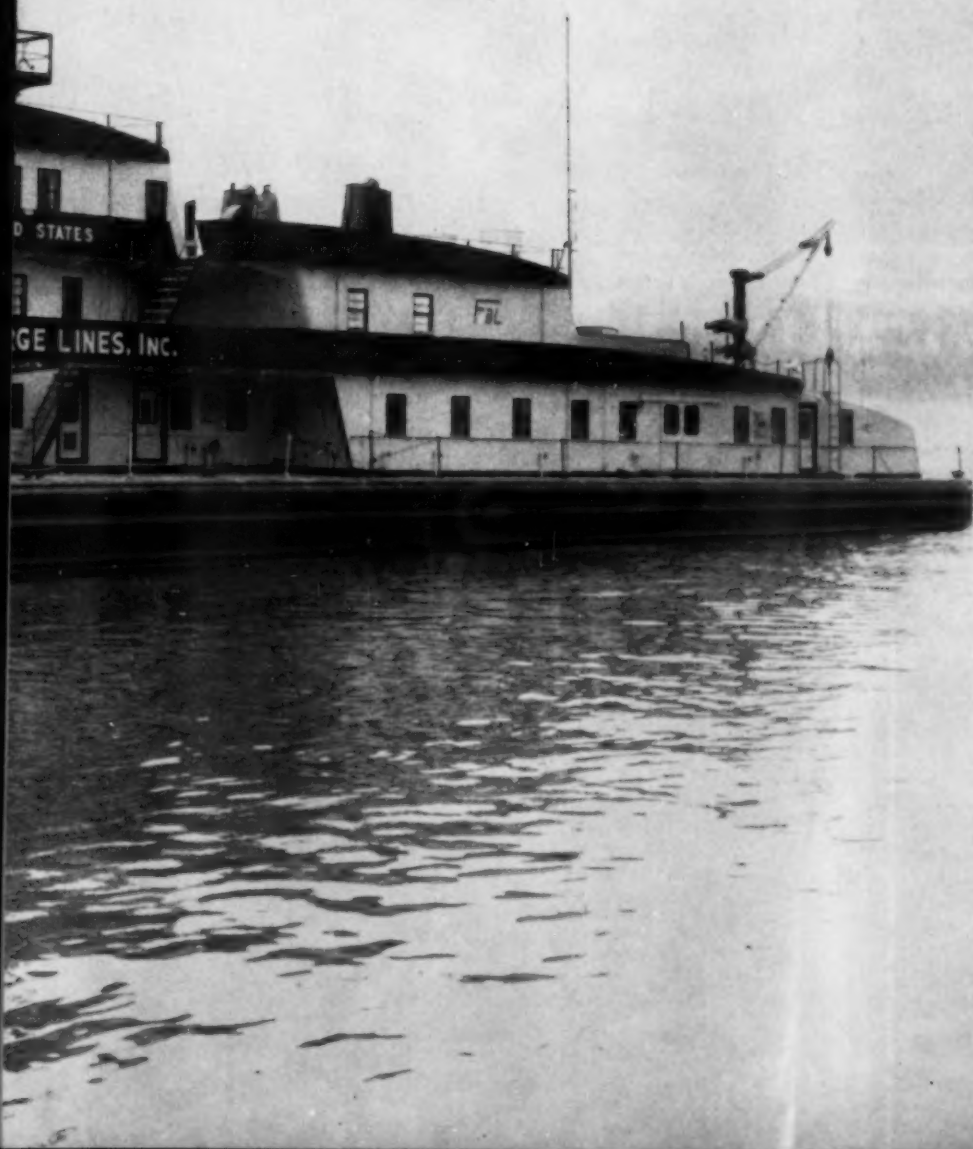
number of barges in tow, the *United States* will travel at speeds ranging from 7 to 15 mph.

Aside from her unique size and power, the *United States* embodies a number of elements in her design and power plant that set the vessel apart. In order to keep within the design draft limitation of 8 ft. 6 in., the maximum propeller diameter was set at 9 ft. Thus for the vessel to develop a total of 8500 hp, four propellers were required for the greatest efficiency. Quadruple screw propulsion is relatively new and has been used on only three other towboats in this country, all built by St. Louis Ship. They are the *Lachlan Macleay*, the *Missouri* and *Urucum I*. Four specially designed Kort Nozzles shroud each of the four propellers increasing pushing power by more than 25 per cent. Well developed stern lines, evolved from extensive model tests conducted at the Netherlands Shipbuilding and Experimental tank at Wageningen, Holland, permit the water to flow freely and evenly to the propellers.

Supplying the propulsion power for the large towboat are four intercooled and turbocharged model LS-8-DRT Cooper-Bessemer direct-reversing marine diesel engines. In selecting these engines, St. Louis Ship officials pointed to their known ability to operate on low grade fuel oils and the success of these slow speed engines in other marine service. The engines, with eight cylinders of 15½ in. bore and 22 in. stroke, are neatly installed in two sets, of port and starboard units. Each engine is rated at 2125 hp at 327 rpm and drives a 108 in. dia. propeller through a tangential spring coupling and a Western Seamaster model 300 MGV 280 reduction gear (1.63:1) for a shaft speed of 200 rpm. The Western gears are each self-contained and have their own lubricating system with Ross heat exchangers mounted on the outside of the housing. During starting and the time required to build up steam and warm the bunkers, the main engines are operated on light fuel. Immediately thereafter, the diesels are switched to heavy Bunker C fuel operation. The



The heavy fuel oil burning main propulsion engines and the auxiliary diesel generator units on the *United States* are cooled by the Vapor Phase system. Here are the Vapor Phase separators which supply steam for heating the heavy fuel oil.



heavy fuel oil handling equipment is exceptionally complete and efficient in its operation and will be described later. Auxiliary power on the *United States* is furnished by three General Motors 6-110 diesel engines installed on the upper engine room platform (first deck) directly behind the switchgear. These engines each drive a 125 kw, 3 phase, 60 cycle, 480 volt Delco generator.

Each of the main engines is started, operated and stopped by Westinghouse Air Brake pneumatic controls with a single lever per engine provided for this purpose. The controls in the pilot house and at the engineers stand are identical except for the addition of a selector valve on the latter which enables the chief engineer to take control of the engines away from the pilot should conditions make this necessary. Air for the Westinghouse system as well as for starting is supplied by two Gardner-Denver air compressors and stored in ten air bottles at 250 psi. The air is then reduced to 100 psi for the air control system.

The Cooper-Bessemer propulsion engines and the General Motors generator engines are cooled by the Vapor Phase system which maintains the coolant at a constant temperature of 252° F. In the propulsion engines, forced circulation is achieved by means of centrifugal pumps. The generator engines employ thermal circulation and no circulating pump is required. In the Vapor

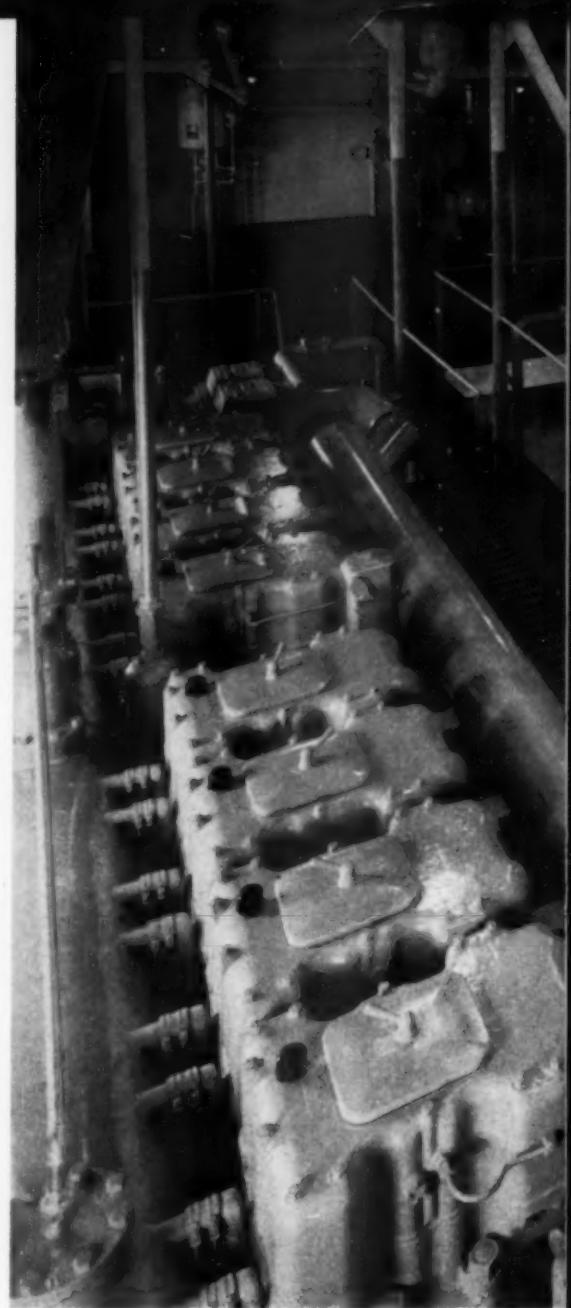
Phase system on the *United States* the engines generate approximately 9,000 lbs. of steam per hour at full load conditions and at 15 lbs. pressure. A mixture of steam and water from the engines passes from the engines to a separator where steam is extracted and water is returned to the engine at substantially the same temperature as the mixture leaving the engine. As experienced in other applications, the high even heat of the engines due to this form of cooling should result in lower maintenance costs through reduced wear on engine parts. Because of the high engine heat, the main propulsion engines are capable of burning the heavy fuel efficiently and are able to idle and run at all speeds on heavy fuel. Heavy fuel for the main engines is carried in eight steam coiled bunkers where it is heated to 80-90° F by means of steam supplied from the Vapor Phase separators. Two Westfalia continuous type centrifuges draw fuel from the bunkers through a preliminary stage heater which raises the temperature to 180° F. Clean fuel is then discharged to a 200 gal. steam heated day tank. From the tank the fuel is pumped through four final stage Graham steam heaters which raise the temperature to about 200° F. The fuel is then pumped through Hilco duplex filters, a Nemec fuel control panel and then to the engine. The Nemec panel located near each engine, makes possible the switch from either light to heavy fuel, with an automatic purging period to cleanse the pipe lines of heavy fuel. Complete control of the fuel supplied to the engines is afforded the engineer through Westinghouse Air Brake controls between the engine room central control station and the Nemec control.

Light fuel oil for engine starting and warm-up and for the auxiliary engines is carried in four hull tanks, cross connected so that the fuel service pumps may draw from a day tank and discharge to the main engines through the duplex filter and Nemec control panel, maintaining a constant pressure on the engines. Excess fuel is discharged through an unloading valve to a light oil day tank, which supplies fuel to the generator sets and the heating boiler. Cooling water for condensers and main and auxiliary engine lube oil coolers is circulated through closed skin coolers. Skin cooling,

developed by St. Louis Ship, uses a series of hair-pin bends on the port and starboard sides of the hull which are exposed to the river water.

The modern streamlined three deck superstructure of the *United States* with its bright yellow and black trim is truly a sight to behold and its design is as efficient as its projected operation. Two powerful steering systems of the St. Louis Ship mechanical-hydraulic type are installed on the vessel. One system controls the four steering rudders and the other controls the six flanking rudders. This system is so designed that the rudders can be turned hard-over to hard-over in 14 seconds while towing, and by means of a unique follow-up system, the position of the pilot house levers indicates the exact rudder position. The steering systems are located aft of the engine space which extends to the top of the deck house. The Burgess-Manning exhaust silencers and Vapor Phase separators are also an integral part of the deck house to assure clean lines and easy access to the equipment. A flying bridge provides clear view of objects alongside. Forward and side decks, more than 15 ft. wide, are protected with generous overhangs important in inclement weather and the deck locker allows more than 300 sq. ft. for lines and ratchets.

The control console located in the large glass enclosed pilot house places all engine controls, steering controls and aids to navigation within arms reach of the pilot. Aids to navigation include depth recorder, automatic pilot, radar, radio-telephone, intercommunication and public address system, searchlight controls and sound powered telephone. It is interesting to note that the roof of the pilot house towers more than 39 ft. above the water. Just below the pilot house on the third deck is a walnut panelled guest and officer's lounge and, two large guest rooms adjoining rival the finest hotels for quality of appointments. Six staterooms with adjoining baths make up the officers' quarters on the second deck, while the quarters on the main deck house ten crew members. Three baths, a laundry, a paint locker, a lounge, a pantry, an air conditioning room, mess and galley complete the main deck arrangement.

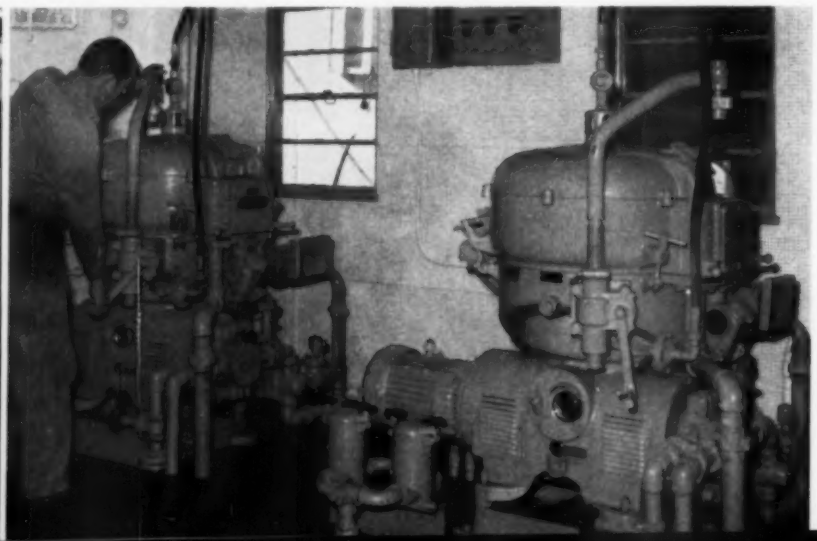
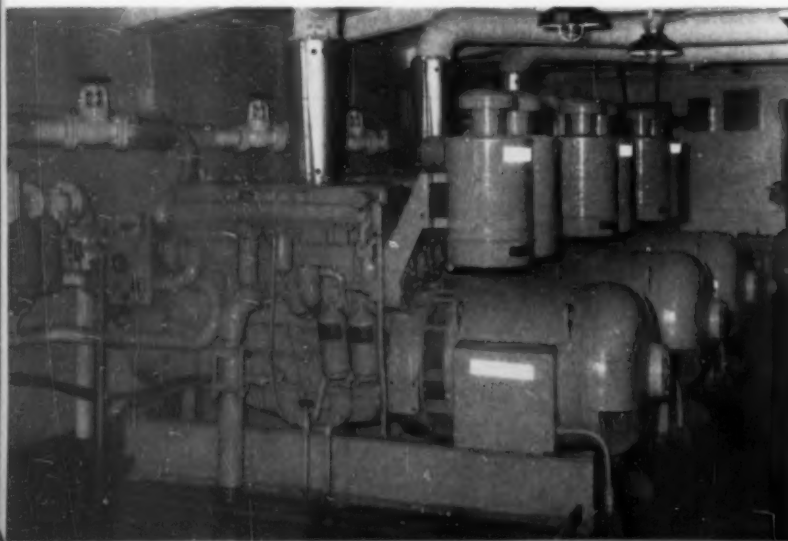


The steel hull is generously subdivided and framed on the transverse and longitudinal system with scantlings exceeding the requirements set up by

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Auxiliary power on the towboat is supplied by these three General Motors Detroit 6-110 diesels, each driving a 125 kw Delco generator. Engines are equipped with Woodward governors, Donaldson air cleaners and Commercial fuel oil filters. Amot tempering valve controls cooling water to each engine.

Two Westfalia model SAOG-4016 de-sludgers (one is standby) purify the residual oil in a one-step operation. Oil is fed the de-sludger at 180-200°F., 70 to 83 SSU viscosity. Single unit has separating capacity of 500 gals./hr. and serves all four engines.







Upper level view of engine room showing its four Cooper-Besemer 2125 hp diesels with the Woodward governors located in the middle of each bank of eight cylinders. Detroit Diesel generator units are shown in the background located behind main switch gear. Vapor Phase separator supplying cooling water to these units is to left.

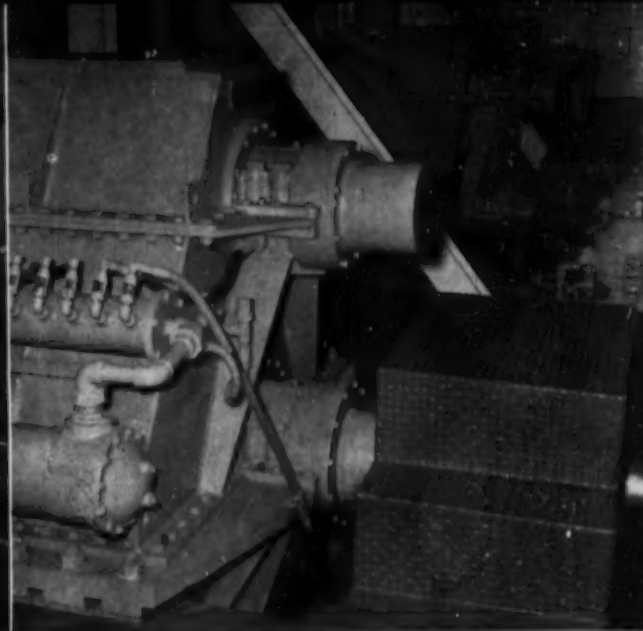
the American Bureau of Shipping. The bottom, bilge and tunnel plating is  $\frac{1}{2}$  in. thick; the side plating and all bulkheads are  $\frac{3}{8}$  in. stiffened both vertically and horizontally. The deck plating ranges from  $\frac{1}{4}$  to  $\frac{7}{16}$  in. thick. Two heavy  $\frac{1}{2}$  in. fenders running the full length of the hull and across the stern protect the hull.

### List of Principal Equipment

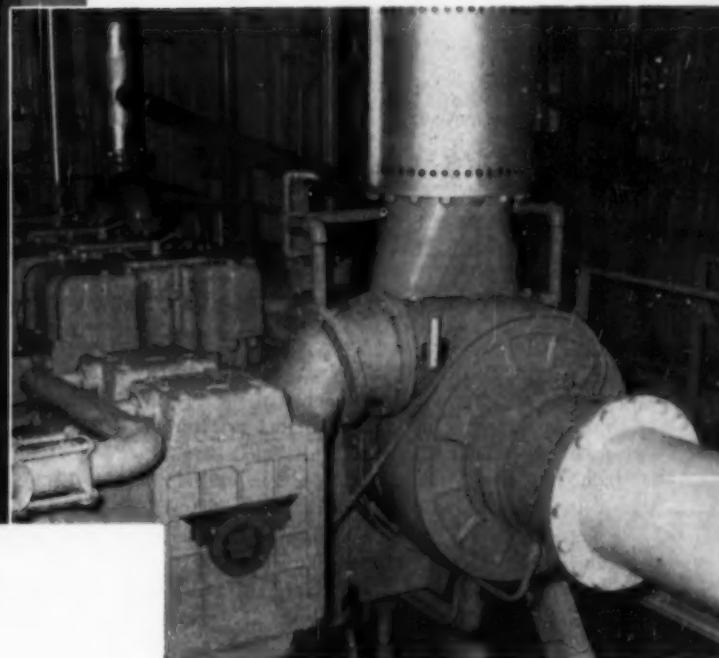
Serving Four Cooper-Besemer Main Engines  
 Reduction gears ..... Western Gear  
 Governors ..... Woodward  
 Recording tachometers ..... Minneapolis Honeywell  
 Temperature control valves ..... Amot  
 Intake air filters ..... American Air Filter  
 Intercoolers ..... Young  
 Vapor Phase system ..... Engineering Controls  
 Exhaust silencers ..... Burgess-Manning  
 Fuel control units ..... Nemec  
 Engine controls ..... Westinghouse Air Brake

Air compressors ..... Gardner-Denver  
 Heavy fuel centrifuges ..... Westfalia  
 Lube oil centrifuges ..... DeLaval Separator  
 Heat exchangers and condensers ..... Graham  
 Fuel oil filters ..... Hilliard  
 Turbocharger oil filters ..... Commercial  
 Motor generator set ..... Fairbanks-Morse  
 Lube oil filters ..... Wartenbe  
 Reduction gear heat exchangers ..... Ross  
 Exhaust pyrometers ..... Alnor  
 Serving Three General Motors Auxiliary Engines  
 Generators ..... Delco  
 Temperature control valves ..... Amot  
 Governors ..... Woodward  
 Fuel oil filters ..... Commercial  
 Air cleaners ..... Donaldson

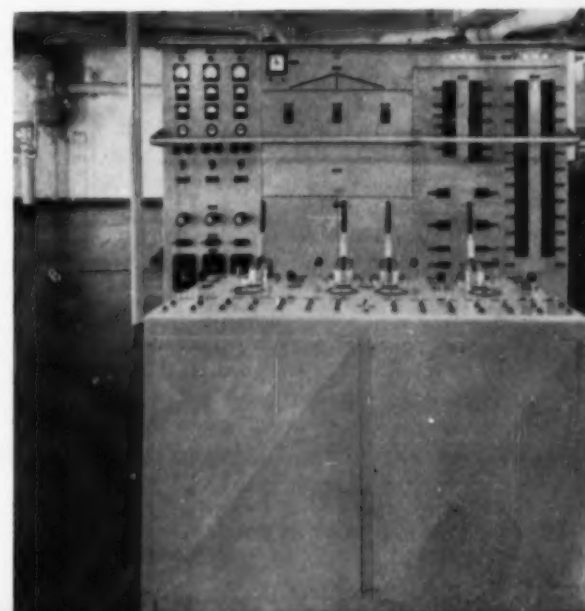
Westinghouse Air Brake engine room control stand which is duplicated in the pilot house. Behind is main switch gear and to left is Vapor Phase separator serving auxiliary engines.



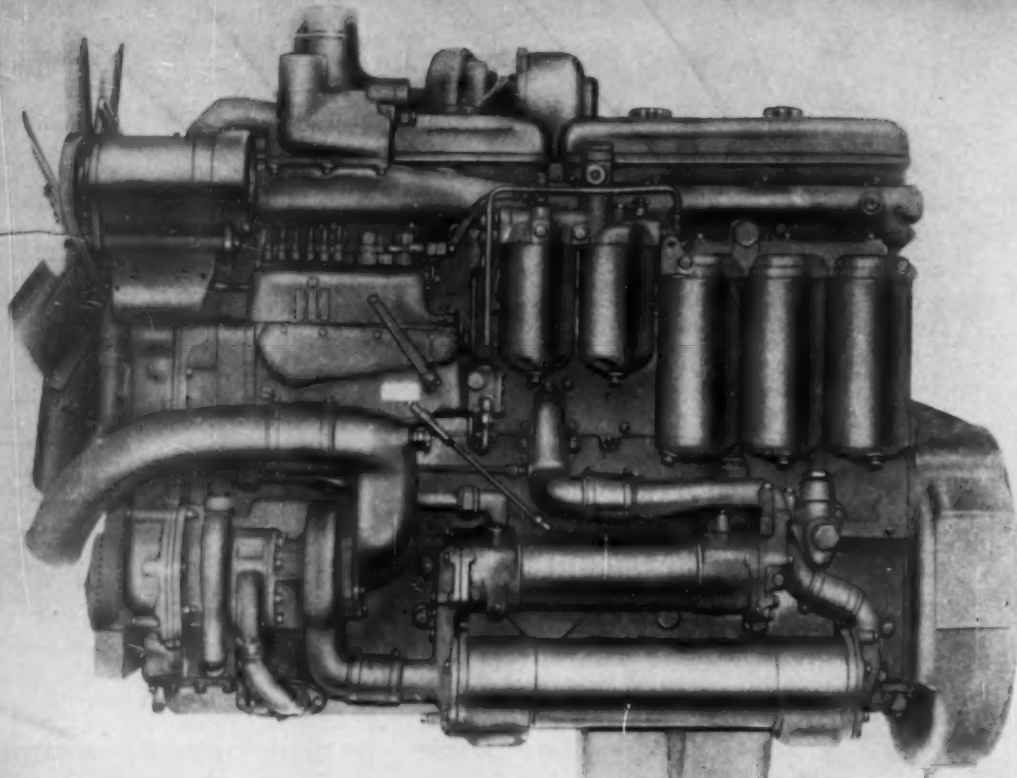
Three of the four Western Seamaster (1.626:1) reduction gears provide shaft speed of 200 rpm. Note Ross lube oil cooler. To right are DeLaval lube oil centrifuges.



Turbocharger end of the LS-8-DRT Cooper-Besemer propulsion engines showing the duplex Young intake air intercooler.

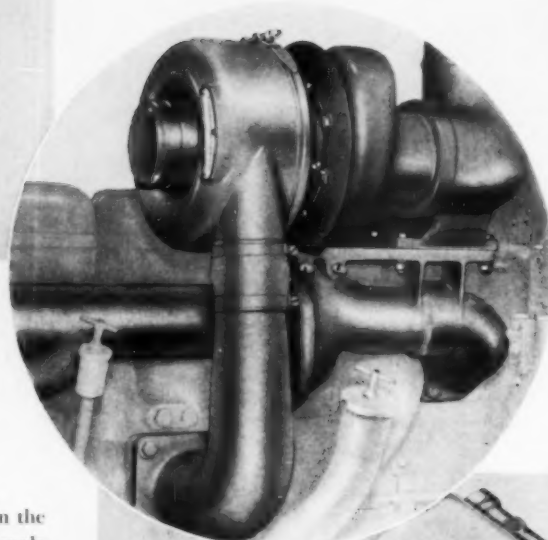






Side view of the 375 hp D-817 diesel showing IH fuel injection pump, lube oil and water pump at left, Ross lube oil and torque converter cooler, Purolator three element full flow lube oil filter, and primary and final stage fuel filters. Delco Remy 24 volt generator is also shown.

Schwitzer turbocharger assembly on the D-817 diesel. This is a 4 in. model 650 Schwitzer turbo with a pressure ratio of 2.4. When the engine is developing its maximum 375 hp, the turbine attains speeds as high as 70,000 rpm.



## IH INTRODUCES NEW 375 HP HIGH OUTPUT DIESEL

By BRUCE W. WADMAN

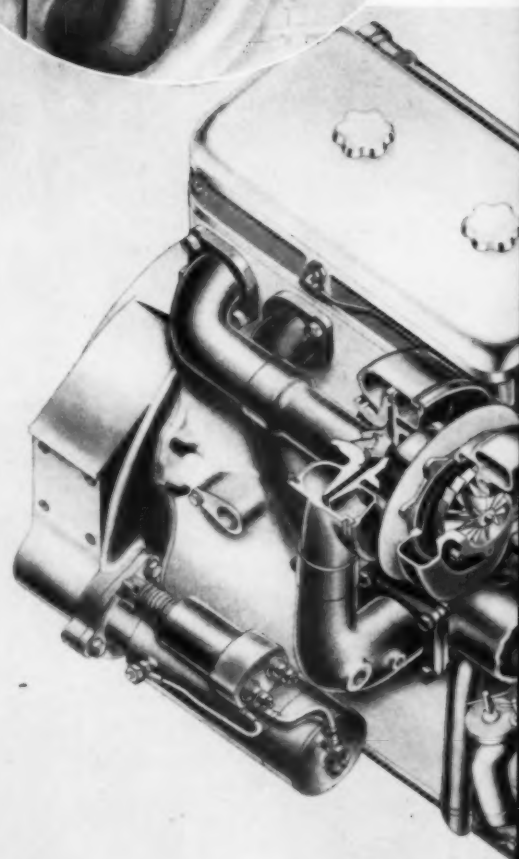
**I**NTERNATIONAL Harvester has announced an entirely new diesel engine in the 240 to 375 hp range in naturally aspirated and turbocharged versions. Designated the model D-817, this new engine is a six cylinder four cycle unit with a bore of 5 3/4 in. and a stroke of 6 in. It displaces 817 cu. in., and has a compression ratio of 16:1. The turbocharged model is rated 375 intermittent hp at 2100 rpm and the naturally aspirated model is rated 240 intermittent hp at 2100 rpm. C. E. (Skip) Jones, Manager of Engine Sales of the IH Construction Equipment Division, reports; "The 817 offers more horsepower than any other diesel in our line. It is a high output, heavy duty engine ideally suited for service in all types of equipment including rubber tired earth-moving equipment, off-highway trucks and large on-highway trucks. This very flexible engine is the ideal power source for all industrial applications including generator sets and marine propulsion duty."

The engine boasts important design features that will be detailed later in the text and in accompanying illustrations, but of prime interest are the combustion chamber design and the fuel injection system. The combustion chamber is of the open type, which permits direct electric starting. It is of symmetrical design, air swirl being added by use of an offset counterbore feature in the cylinder intake port. By this means an initial swirl is started as valves open and once started, it lasts through the compression stroke. Each cylinder has four valves for better breathing; two intake valves and two exhaust valves. The fuel injector is positioned

vertically in the center of the cylinder between the valve sets, and injects fuel at a 160° spray angle into the cylinder. An aluminum alloy piston is used and the crown is shaped in a shallow dish with a peak in the center. Major features of the combustion chamber and other key areas in the engine have been developed by International engineers with the express purpose of adapting the D-817 most effectively to turbocharging. The accompanying power curves of the turbocharged version vividly point this out in the excellent fuel consumption characteristics indicated.

The fuel injection system takes the well known IH twin plunger pump, which formerly performed all functions of metering and providing pressure for actual injection of fuel into cylinders, and changes it to serve a precision metering function only. This is accomplished by a helical plunger and barrel that gives each cylinder an equal charge of fuel at all times. The fuel is stored in the individual fuel injector and a cam operated plunger in the injector forces fuel into the cylinder. This system provides precise control of metered fuel and results in smooth and even power from all six cylinders.

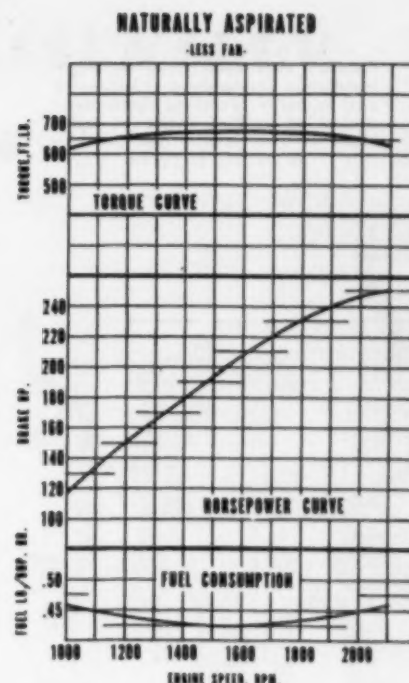
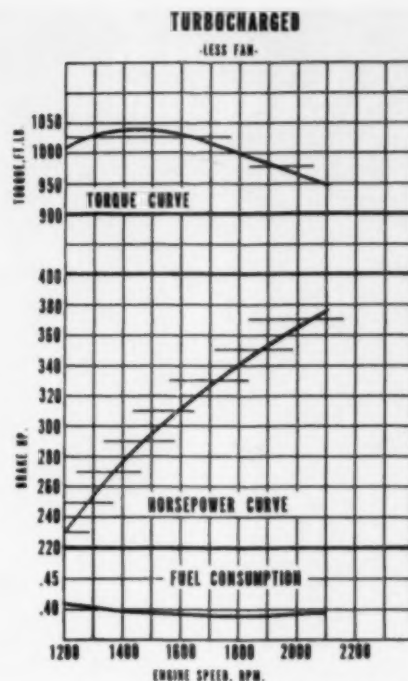
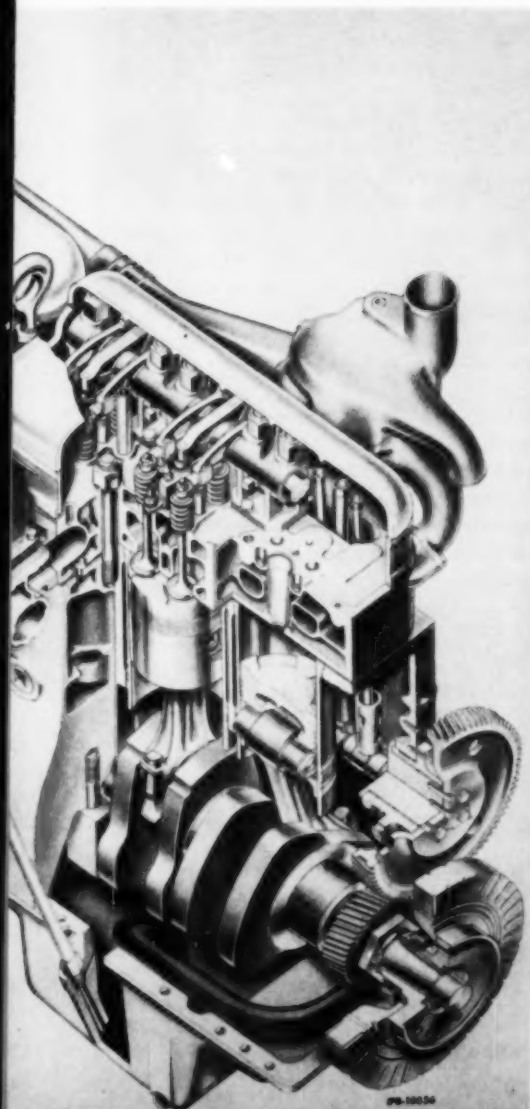
The crankcase is internally ribbed to insure the extra strength and rigidity required for long life operation under heavy load demands. The heavy ribbing plus thick webs for each of the seven main bearings provide excellent mounting for the crankshaft. The crankshaft is fully counterbalanced and twice hardened with crankpin diameter



of 3.5 in. and main journal diameter of 4.5 in. The main bearings are trimetal with ground steel backing of .150 thickness and .020 copper-lead bearing overlay with a tin plating .001 thick. The cylinder liners are of wet type construction with separate barrel around each liner to obtain high velocity turbulent coolant flow and good scrubbing action of water around the liner. The connecting rod bearings are of the same construction as the main bearings. The connecting rod bushings are cast bronze on steel backing. The camshaft is made up of three lobes per cylinder, one for the exhaust valves, one for the intake valves, and one for the fuel injector. It is driven directly from the crankshaft at  $\frac{1}{2}$  engine speed. The camshaft has seven bearings, thrust being taken on the front bearing. The aluminum alloy pistons have three compression rings and one oil control ring. The top ring is carried in a Ni-Resist insert for long life.

There are two cylinder heads; one for each three cylinders. The rocker arm assembly in each head is mounted on four brackets and is located and held down by the cylinder head studs and nuts. There are three rocker levers per cylinder, one for each set of valves and one for the injector. The two intake and exhaust valves per cylinder are actuated by one lever through a valve bridge. Thompson positive type valve rotators are used on all valves as well as valve seat inserts to promote long valve life. The exhaust valves are stellite; stem diameter is .435 for all valves and port

Perspective cutaway showing piston crown shape, valve mechanism, cooling passages, turbocharging system and other major engine parts.



## POWER CURVES

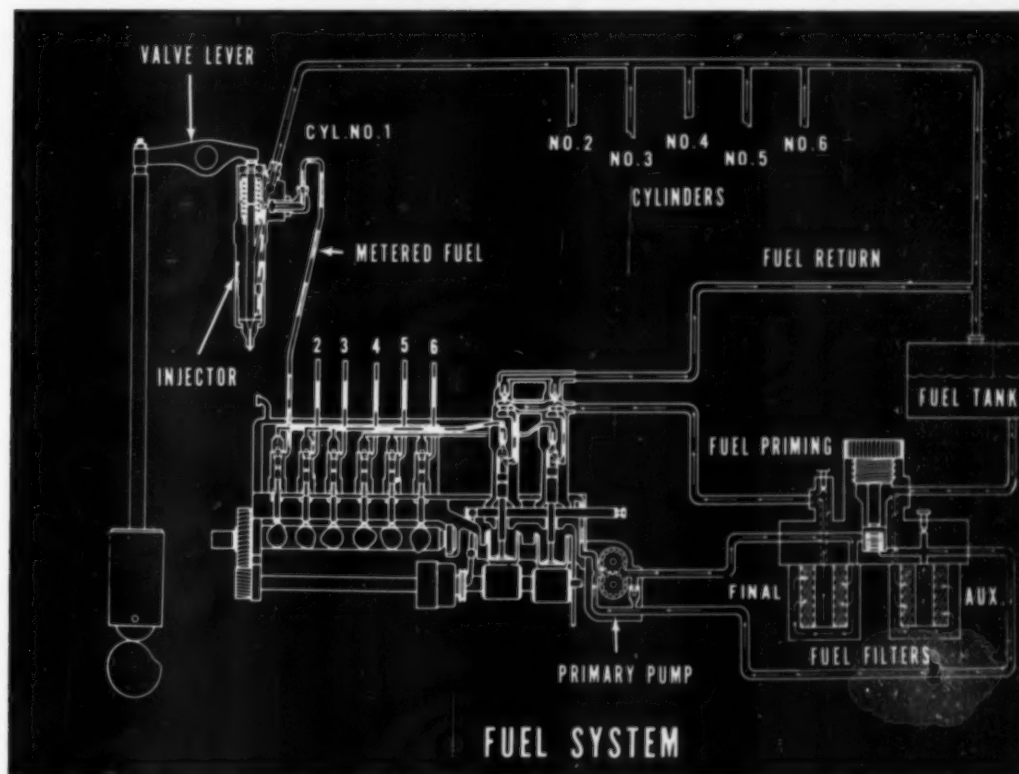
Power curves of the turbocharged and naturally aspirated engine. Note the fuel consumption in the turbocharged engine, indicating a well matched combination of turbocharger and engine.

diameter is 1.531. An aluminum cylinder head fence is bolted to the cylinder head, provides protection for the head mechanism and retains the lubricating oil. Rubber seals are inserted in the top and bottom of the fence to prevent leakage and provide easy removal and replacement of fence and valve cover. An aluminum valve cover completes the cylinder head enclosure. A water

cooled copper sleeve to carry the injector is inserted in the head and rolled at the top to seal.

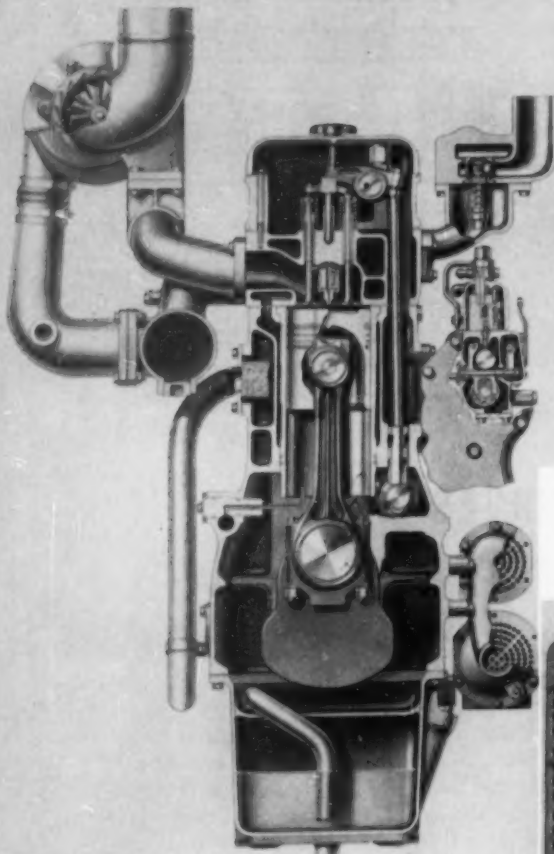
The gear train at the front of the engine consists of nine gears in the complete train, including the hydraulic pump gear and the fan gear. The cooling fan, in a unique feature, is gear driven to provide positive action at all times. Two speed ratios

Fuel system schematic. Arrows indicate flow of fuel from fuel tank through filters, into metering pump, and finally into injectors. Leakage past lapped surfaces in injectors is returned to the fuel tank.

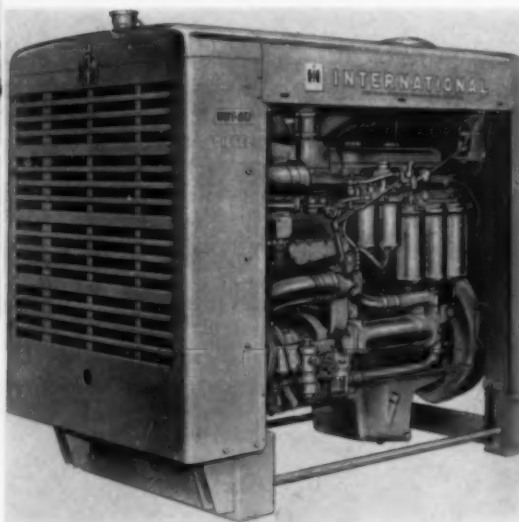




Cutaway view showing turbocharger installation arrangement at left, valve and injector location, thermostatic control of cooling system at right. Note jet arrangement that provides oil cooling of piston.



Enclosed power unit version of the 2100 rpm, 375 intermittent hp D-817 turbocharged four-cycle diesel. This is a six cylinder engine with a bore of 5 1/8 in. and stroke of 6 in., and displacement of 817 cu. in.



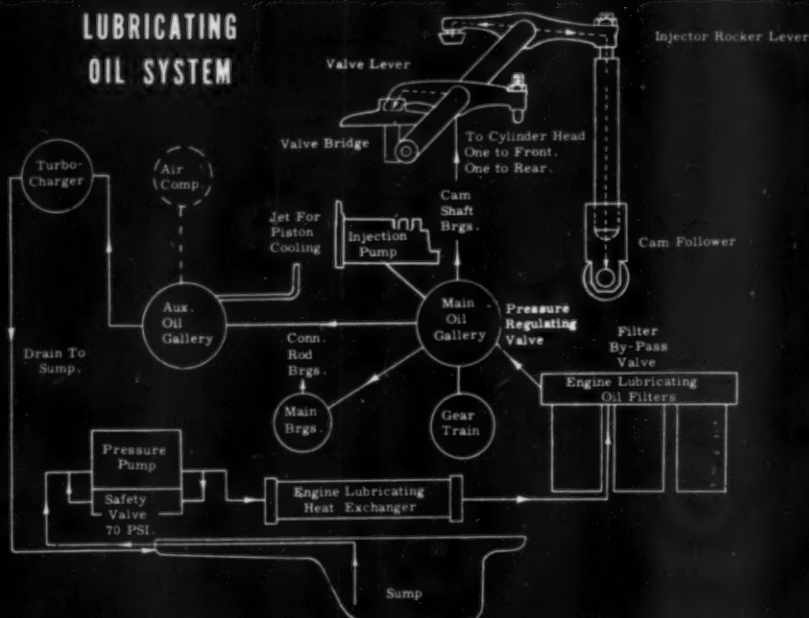
are available by shifting the fan idler mounting in the crankcase. Eight pitch, 20° helical gears are used in the gear train except for the injection pump and pinion gear. Gear train is split so that the total load is not carried through the train.

The cooling system is carefully designed for high efficiency. Coolant flows from the water pump through the engine lubricating oil cooler and torque converter oil cooler when a converter is used. It enters the crankcase between number 3 and 4 cylinders. The coolant then runs through a water gallery which is on the right side of the engine. This water gallery supplies coolant to the cylinder liners. There are two entrance ports at the lower end of each cylinder liner. The coolant leaves the liner barrel at four points 90° apart and enters the cyl. head. The head has a baffle 1 1/4 in. above the lower surface which directs the coolant along the lower surface of the head and up past the copper injector sleeves. The coolant then flows out over the top of the baffle and cools

the port walls, valve guide bosses and the upper area of the head. The coolant leaves the head through a water manifold on the left side of the engine. The front section of the two piece water manifold houses two Detroit Controls Vernatherm thermostats with a temperature range between 165°-180° F. During the warm-up period all the coolant bypasses the radiator and at operating temperature the bypass is closed off and all coolant passes through the radiator. The specific heat rejection is about 30 btu/min./bhp. The coolant flows from the water pump at approximately 140 gpm at 2100 rpm. The water pump is gear driven on a common shaft with the lube oil pump, both being on the outside of the engine for easy access.

The lube oil system has some important features and is illustrated in the accompanying schematic diagram. It is a full pressure system with a lube oil temperature stabilizer that prolongs engine life by controlling the oil temperature during engine warm-up and under heavy operating loads.

## LUBRICATING OIL SYSTEM



Lubricating oil system schematic. This is a full pressure system with full flow lube oil filtration. From main oil gallery to points of lubrication an operating pressure of 40 to 45 psi is maintained.

The pistons are cooled by an interesting jet arrangement. Lube oil is fed at 1 1/2 gpm from a jet that projects under the cylinder liner and sprays up into the inside of the piston. This eliminates the necessity of drilling passages through the connecting rod for oil cooling of the piston. An auxiliary gallery supplies the lube oil to the jets for each cylinder as well as for the turbocharger lube oil system. Full flow lube oil filtration is used with three Purolator filter elements installed in parallel. The oil pan is reversible to adapt to various applications as the lube oil pump is installed on the outside of the engine.

The fuel system is also illustrated in an accompanying schematic view. The injector has a multiple orifice tip with seven orifices, (.007 dia., 160° included spray angle). Peak fuel injection pressure at full load is 20,000 psi. Metered fuel is pumped to the injector under a pressure of 1000 to 1500 psi and when stored in the injector actually becomes an air fuel mixture because the volume of the chamber under the plunger exceeds the maximum fuel volume delivered.

The electrical system features a 24 volt direct electric starting unit. A 24 volt 15 amp generator is standard equipment also. With the new open type combustion chamber direct electric starts can be quickly accomplished down to 30° F. For quick starts below 30° an ether starting attachment is available.

Dimensions of the turbocharged engine are as follows:

Overall length (w/suction fan)	61.25 in.
Overall length (w/blower fan)	61.38 in.
Overall height	55.50 in.
Overall width	39.36 in.
Weight of the turbocharged engine is 3500 lbs. which is approximately 9 lb./hp @ 375 bhp.	

This new engine offers many attractive advantages. It is flexible, offering high output and good fuel economy in a heavy duty design to give long operating life as well as good response characteristics.



# ALASKA CALLS THE ANNA JACKMAN

**T**HE *Anna Jackman*, a Cummins dieselized missionary vessel is now being used in Alaskan waters by the Presbyterian Church U. S. A. Designed to withstand the cold and rugged waters which surround the Alaskan coastline, the new craft was built by J. F. Bellinger & Son shipyard in Jacksonville and has several features, which, if not unique, are to say the least, unusual for a Florida built boat of this size. Dimensions of the *Anna Jackman* are 64 ft. overall length, a 16 ft. beam and a 7 ft. 6 in. draft. The vessel was constructed with five water-tight compartments and steel lock doors between for safety at sea. The three double bottom fuel tanks hold approximately 1200 gals. of fuel oil. Construction costs of the craft ran about \$125,000. Main propulsion for the craft is a matched pair of model NHM 600 Cummins diesel engines each rated a max. horsepower of 200 at 2100 rpm. Fitted with Capital H. Y. C. D. 200 direct drive marine gears and

During the trial runs and the trip down the east coast of Florida, the fuel oil consumption was 4.5 gal./hr./engine at 1650 rpm and 8 gal./hr./engine at 1900 rpm. Speed test runs over the measured mile indicated 10.313 mph or 9 knots at 1600 rpm, 11.263 mph or 9.8 knots at 1800 rpm and 12.768 mph or 11.1 knots at 1900 rpm. Vick Ericsson of Cummins Diesel Engines of Florida conducted these tests. Modern in every detail the comfortable living quarters below decks will sleep 28 people. The neat compact galley is fitted with a large size refrigerator and deep freeze plus the necessary equipment for feeding 40 persons. The 12 by 20 ft. main cabin and lounge has acoustic tiles overhead, the walls are finished with Harborite and mahogany wood trim. A small portable organ is installed in the lounge which will be used as a chapel. Rev. R. T. Stussi, a three year veteran of Alaskan missionary work, who accompanied the vessel from Jacksonville to its new home in

Alaska, is the vessels sea-going minister.

Alaska, the new home of the *Anna Jackman*, has always spelled adventure with a capital "A". It is a panorama of snowy mountains, unexplored waterways and 33,904 miles of dangerous coastline. From the adventurous gold seekers of the nineties and the early missionaries right down through history to the equally rugged preachers of today, who are seeking to bring the Word of God to the lonely outposts and logging camps, Alaska is a challenge. The Presbyterian Church U. S. A. has operated missionary vessels in Alaska for about 40 years and three of the craft have had diesel engines for propulsion. The *Anna Jackman* is replacing the *Princeton Hall* a 65 ft. wooden single screw dieselized craft built in 1941 which has seen a lot of hard service in the Alaskan waters.

The *Anna Jackman* will operate out of Juneau, the capital of Alaska, and will serve an area which consists mostly of rocky fog-bound islands in and around the 16,000,000 acre Tongass National Forest. This forest was recently opened to commercial logging operations. The new logging camps as well as the small fishing villages on the rock bound coast will be served by this new floating House of God. Capt. R. V. Nelson of Juneau and a crew of three native Alaskan indians served as the crew for the long trip home. The indians who volunteered to come to Florida and serve as crewmen, come from the Thlinget, Haida and Tsimpean tribes and are commercial salmon fishermen.



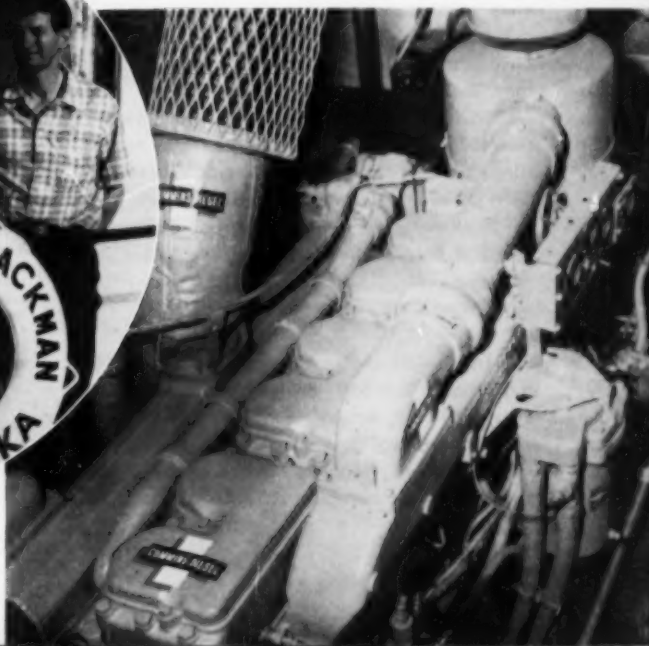
From left: Vick Ericsson, engineer of Cummins Diesel Engines of Florida who supervised the installation of the engines. Reverend R. T. Stussi and Capt. R. V. Nelson, skipper of the *Anna Jackman*.

Walters 3:1 "V" drive reduction gears, they turn 34x31 in. three-bladed style I Columbia propellers. The 2½ in. dia. monel propeller shafts ride in Goodrich cutless bearings. The engines are cooled by keel coolers built into the keel by the shipyard. Kittell mufflers are used on the main engines. Electric power is produced by a Lister diesel engine driving a 4 kw ac 60 cycle Winpower generator at 1800 rpm. The starboard engine drives a 3 kw Onan line shaft generator to charge the ships service batteries. Other engine room equipment on the *Anna Jackman* includes a Quincy air compressor, Way-Wolff ships furnace for the cold weather and Barnes pumps.



The "Anna Jackman" built for Presbyterian missionary work in Alaska, leaves Florida for its homeport in Juneau.

One of the two model NHM 600 Cummins marine diesel engines, each rated 200 max. hp at 2100 rpm. These diesels have Penn Safety controls, Nugent lube oil strainers, Vortox air breathers and a Luberliner #750 oil filter. Purolator duplex filters are used in the fuel oil system.



# SEMI-AUTOMATIC TRUCK TRANSMISSION

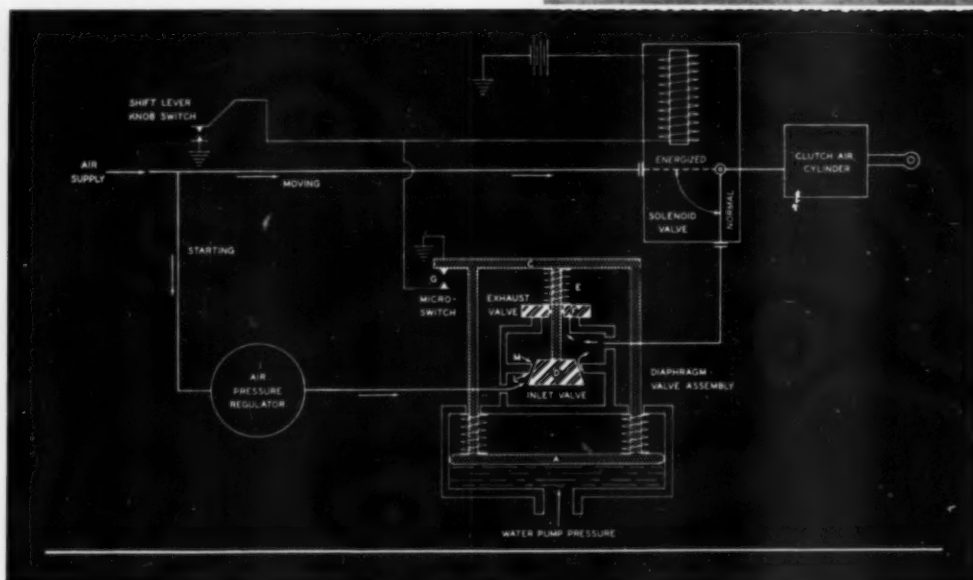
**A** NEW and unique semi-automatic truck transmission system has been announced by the Dana Corporation. This new system, called Presto-matic, was unveiled recently at the Diamond T Motor Truck Company plant in Chicago. Diamond T standard and COE diesel trucks were utilized to illustrate the performance of the transmission system. The Presto-matic transmission completely eliminates the clutch pedal in heavy duty trucks. Instead of the clutch pedal, there is a touch-button control on top of the gearshift lever that engages or disengages the clutch at the driver's touch. Smooth engagement from a standing start is automatic due to a sensing mechanism which synchronizes clutch engagement with the speed of the engine. The action duplicates the control of a driver employing a pedal, effecting full engagement of the clutch as the engine develops its maximum torque. Similarly, the clutch is automatically disengaged when the engine returns to idling speed. The combination of these two automatic actions permits a driver to inch along in heavy traffic, without touching the control or shifting gears, just as he would with a full-automatic transmission. The Presto-matic transmission system retains the fuel-saving characteristics of a clutch-type power train, provides ease of control, and leaves the selection of the proper gear in the hands of the driver for greatest safety under all conditions.

The Presto-matic system consists of three basic parts: (1) Any of the Dana synchronized transmissions from 5 speed to 12 speed; (2) A matching Spicer clutch; (3) An automatic clutch control. For diesel on-highway and off-highway truck applications the transmission system will range in capacity from 300 ft. lb. to 800 ft. lb. input torque. The key to the Presto-matic is the automatic clutch control. To explain this control it is simplest to consider it as two separate operations. (A) An automatic starting cycle, and (B) an effortless driver-controlled shifting cycle. In the starting cycle the water pump is used as a speed control signal with a static water line connecting the pump and a diaphragm valve. A balance is maintained between the water pressure from the water pump on one side of the diaphragm and air pressure that operates the clutch air cylinder on the other side of the diaphragm. With the engine idling, full air pressure holds the clutch in the released position and as engine speed increases, pressure from the water pump acts on the diaphragm valve and reduces the air pressure to engage the clutch smoothly. A pressure regulator is used to maintain uniform engagement.

The driver-controlled part of the cycle comes in after a start has been made automatically; and when the driver decides to shift up or down, he presses the control button on the gear shift lever. This is an overriding control which operates through a 3-way solenoid valve. This is normally

in the automatic cycle, but the driver may over-ride this with his touch-button control. This instantly allows full air pressure to release the clutch and the driver makes the required shift. As he releases the touch-button control, the operation goes back into the automatic cycle and a smooth re-engagement of the clutch is obtained. The accompanying system diagram and description fully illustrates the operation of the automatic control.

The Presto-matic transmission system offers advantages to the truck driver in ease of operation, control of the vehicle, reduced fatigue, and reduction of physical effort required to drive a diesel truck. The average truck clutch requires a pedal pressure of 45-75 lbs. to release and this movement must continue through a distance of about 6 in. In traffic, particularly, this is a major physical problem for the driver. By having the full range of



1. With the engine idling, minimum water pressure from the cooling system enters the Diaphragm Valve Assembly and presses against Diaphragm (A), raising Bracket (C) slightly. The upward movement of (C) is sufficient to open Micro-Switch (G)—but not enough to close Inlet Valve (D). The open Micro-Switch de-energizes the Solenoid Valve to "normal" position. This directs the air supply thru the Air Pressure Regulator and the Inlet Valve to the Clutch Air Cylinder to dis-engage the clutch and allow the shift to starting gear.
2. With initial engine acceleration and increased pressure, the upward movement of (A) and (C) continues. This begins to "unload" Spring (E) which holds Exhaust Valve (F) seated and air begins to bleed from the system. With further acceleration the "unloading" of (E) continues, and the Inlet Valve closes. Pressure in the Clutch Air Cylinder escapes thru the Exhaust Valve. This releases the piston in the Air Cylinder and engages the clutch.
3. The Diaphragm Valve Assembly motivation is the "brain" of the Presto-Matic—which controls clutch engagement in direct proportion to engine speed and results in consistently smooth starting.
4. When the vehicle is moving under normal operation, the Inlet Valve (D) is closed and the Exhaust Valve (E) is fully open. The Solenoid Valve is in "normal" position—with the Clutch Air Cylinder open to atmosphere.
5. To dis-engage the clutch under the above (4) conditions, the driver presses the Shift Lever Control Knob which activates the Solenoid Valve to "energized" position. Air supply moves directly to the Clutch Air Cylinder and dis-engages the clutch.

position. Air supply moves directly to the Clutch Air Cylinder and dis-engages the clutch.

6. To re-engage the clutch, the driver releases the Shift Lever Knob—returning the Solenoid Valve to "normal". This instantaneously cuts off the direct air supply and exhausts the cylinder air pressure through the Exhaust Valve (F).

7. As the vehicle slows to a stop, water pressure is reduced, causing Diaphragm (A) and Bracket (C) to drop. This opens Inlet Valve (D) and closes Exhaust Valve (F)—allowing air supply to move thru the Air Pressure Regulator and Diaphragm Valve Assembly to dis-engage the clutch automatically.

8. Note that the diameter of the Inlet Valve opening is smaller on one side than the other. This causes the greater area pressure on the supply side (L) to counteract back-pressure thru (M) and resist opening. This design assists in keeping the clutch engaged at engine speeds considerably below those required to initiate clutch engagement.

9. In emergency brake stops, where the engine R.P.M. is dropped faster than the regular water pressure, any R.P.M. less than a pre-set idle speed will cause Micro-Switch (G) to immediately de-energize the Solenoid Valve to "normal" position—allowing the air pressure to escape thru the Exhaust Valve. As the clutch becomes dis-engaged and the engine returns to normal, the regular system regains control.

Diagrammatic illustration and description of Presto-matic system.

transmission gears at his fingertips with Presto-matic, the driver maintains complete control of the vehicle. A good driver can and must anticipate

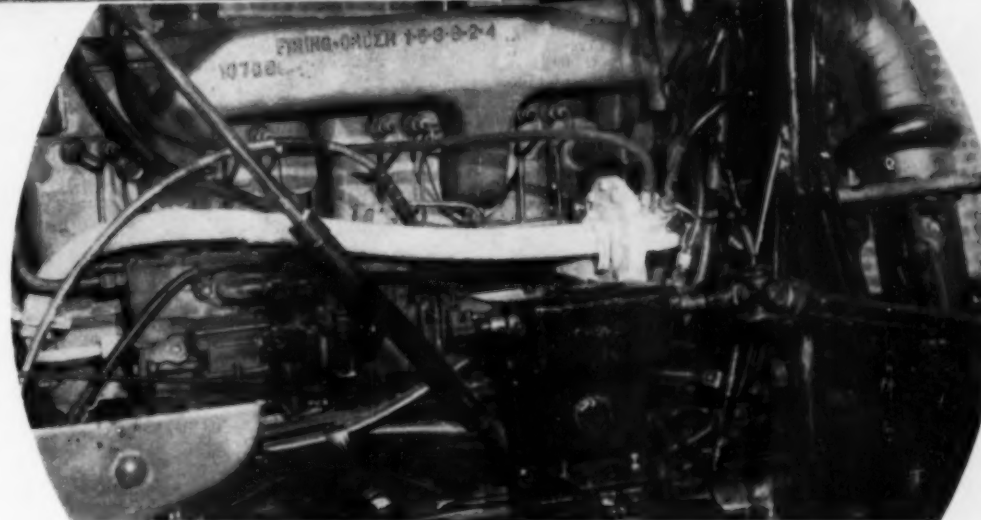
driving conditions and operate his truck accordingly. This can all be accomplished with the Presto-matic system.





Diamond T Conventional diesel tractor with Presto-matic transmission system.

View of Dana Presto-matic components installed on a Cummins NH 220 diesel in a Diamond T Tilt Cab truck. The diaphragm clutch control unit and 3-way solenoid valve are shown in white on the engine.



The fleet owner is also offered attractive advantages with this system. With automatic smooth clutch engagement, life of driveline components is increased. Controlled engine speed during the automatic starting cycle increases clutch life due to the elimination of hot rod starts. The driver also can not ride the clutch pedal. The system is so designed that special tools or training are not required to service the units. The only parts different than the standard transmission and clutch assembly is the automatic control units, which are relatively simple. The Presto-matic also offers good fuel economy as it retains the high efficiencies of

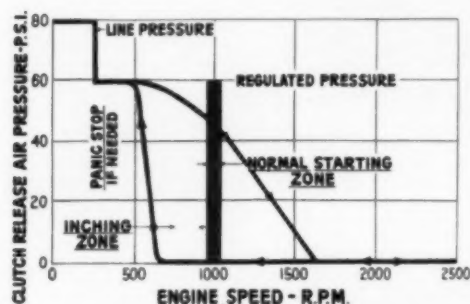
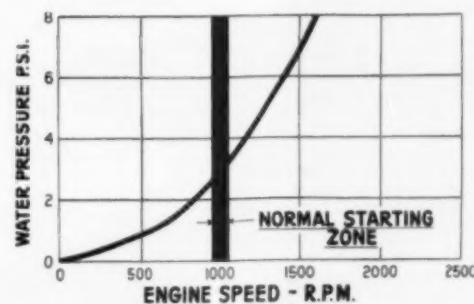


Chart showing clutch engagement characteristics of the Presto-matic system. The clutch is capable of handling full engine torque at about 1000 rpm.

a mechanical transmission. Demonstrations with a Diamond T COE tractor powered with a Cummins NH 220 diesel driving through a Dana 12-speed Synchro-Master transmission equipped with



Water pressure at diaphragm, as shown in this chart, actuates automatic clutch control to smoothly engage clutch as engine speed is increased from idle to operating speed.

the Presto-matic system and pulling about a 40,000 lb. trailer illustrated the good operating characteristics of the unit. In heavy traffic and also in shifting to reach highway speeds, the driver was able to make shifts without the engine speed dropping below 1500 rpm. This is important in saving fuel by keeping the diesel within its most efficient operating speed range. Shift changes were made quickly and easily with good response by the truck either inching in traffic or accelerating to highway speeds.

This new system also offers the truck manufacturer advantages particularly in installation of remote control units. This applies to Tilt cab, COE, and bus applications as clutch pedal linkage is eliminated. The transmission system is also light in weight with the automatic control units contributing very little weight increase over standard components. Several other design features are

worth mentioning as they indicate further to a reliable transmission system. One of the key features of the Presto-matic keeps the clutch from full engaging until the engine is turning about 1500 rpm. Yet, the clutch will not disengage until a near idle of 500 rpm is reached. Fully engaged in this sense means a point where the air cylinder pressure is zero. Actually, the clutch is capable of handling full engine torque at about 1000 rpm. Further, in energizing the diaphragm control from the water side, the water velocity off the tips of the water pump supply the pressure. This makes the diaphragm insensitive to conditions within the cooling system as a whole. Erosion of water pump blades will affect the operation of the diaphragm, but only to increase the engine speed at which the clutch will engage. This has the advantage of also serving as a warning to the truck operator that the water pump is in need of maintenance attention.



## 1000 HP GAS TURBINES IN A 40 MPH CREW BOAT

**A** MAJOR break-through in the age-old problem of how to get a boat through the water faster with heavier loads was announced by Andrew J. Higgins, Jr., president of the famous boat-building firm at trial trip of a Solar Gas Turbine driven crew boat in New Orleans late last year. Mr. Higgins termed the development of this new boat as a "Quantum jump" in marine design, expecting it to revolutionize water transportation as his company's PT and landing boats revolutionized landing operations in World War II. The vessel is 52'-10 1/2" long with a hull form called "Polyhedral"\* by the builder. A 30-passenger personnel or crew boat, it is built of non-corrosive Alcoa aluminum and is driven by a pair of Solar gas-turbine engines. Mr. Higgins briefly stated the idea behind the "Polyhedral"\* design: "Practically all boat forms are compromises to attain desirable features for successful progress through water. Where seaworthiness predominates, some sacrifice is generally made in speed, or vice-versa. We believe we have accomplished a design where a minimum of compromise is made. Tests show that we have attained strength, seaworthiness, maneuverability, high-capacity load-carrying ability, anti-corrosion protection, and speed—even in rough water. "Working with the Aluminum Company of America and the Solar Aircraft Company", he said, "Higgins engineers developed and produced a boat which solves many of the problems besetting industries where water transportation is a time and cost factor. In the area of fast, dependable boats, such as rescue and patrol boats, we expect this prototype to be revolutionary." Target of the company's basic research was the problem of speed in rough water. Where large groups of workers have to be transported over water, such as in the United States offshore areas, this problem has not only been costly, but dangerous and vexatious as well. With the Higgins "Polyhedral"\* design, speeds in the 40 MPH range can be easily maintained even in 3 1/2' waves, he said. "This is accomplished," he said, "by means of a radical hull bottom not only providing a comfortable ride, but insulating against the tendency of the boat to pound in rough water. The underwater form of the hull has longitudinal "breaks" of sufficient depth to deflect and effectively prevent the normal transverse flow of water from the keel to the chines at all positions of trim." The "breaks" create a greater amount of deadrise than would be possible with the conventional smooth skin bottom with the same area and depth. This offers a smaller angle of entry into the water surface which reduces the wave impact. The "breaks" deflect water flow away from the hull, and frictional resistance is thereby reduced and a cushioning effect on the downward movement of the bow results. The use of aluminum gives lightness and strength, increasing speed without a corresponding decrease in sturdiness of construction. The use of gas-turbine engines applies more horsepower per pound of engine. No similar craft with similar characteristics could attain the same speed. "The power plant," he said, "is relatively new for boats." Two Solar Aircraft Company's 500-horsepower gas-turbines, adapted for marine use, power the craft. Each deliver their horsepower through reduction gears and V-drive units to turn 26-inch diameter by 32-inch pitch, three blade, specially designed propellers at approximately 1625 RPM.





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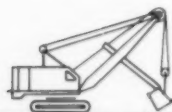


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## **CUMMINS 450 AND 600 h.p. V-12 DIESELS**



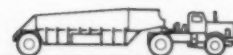
AUTOCAR  
40 ton end dump



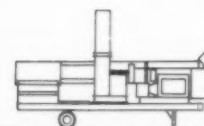
BUCYRUS-ERIE  
4 yd. shovel



MICHIGAN  
480 Tractor-Dozer



EUCLID  
51 ton coal hauler



HETHERINGTON-BERNER  
mixing plant



KENWORTH  
36 ton rear dump



KW DART  
50 ton end dump



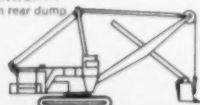
LE TOURNEAU-WESTINGHOUSE  
80 ton coal hauler



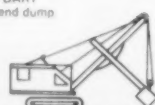
BALDWIN-LIMA-HAMILTON  
4 yd. shovel



MAK  
34 ton rear dump



MANITOWOC  
5 1/2 yd. shovel



MARION  
4 yd. shovel



M.R.S.  
70 ton scraper



P. G. LE TOURNEAU  
130 ton scraper





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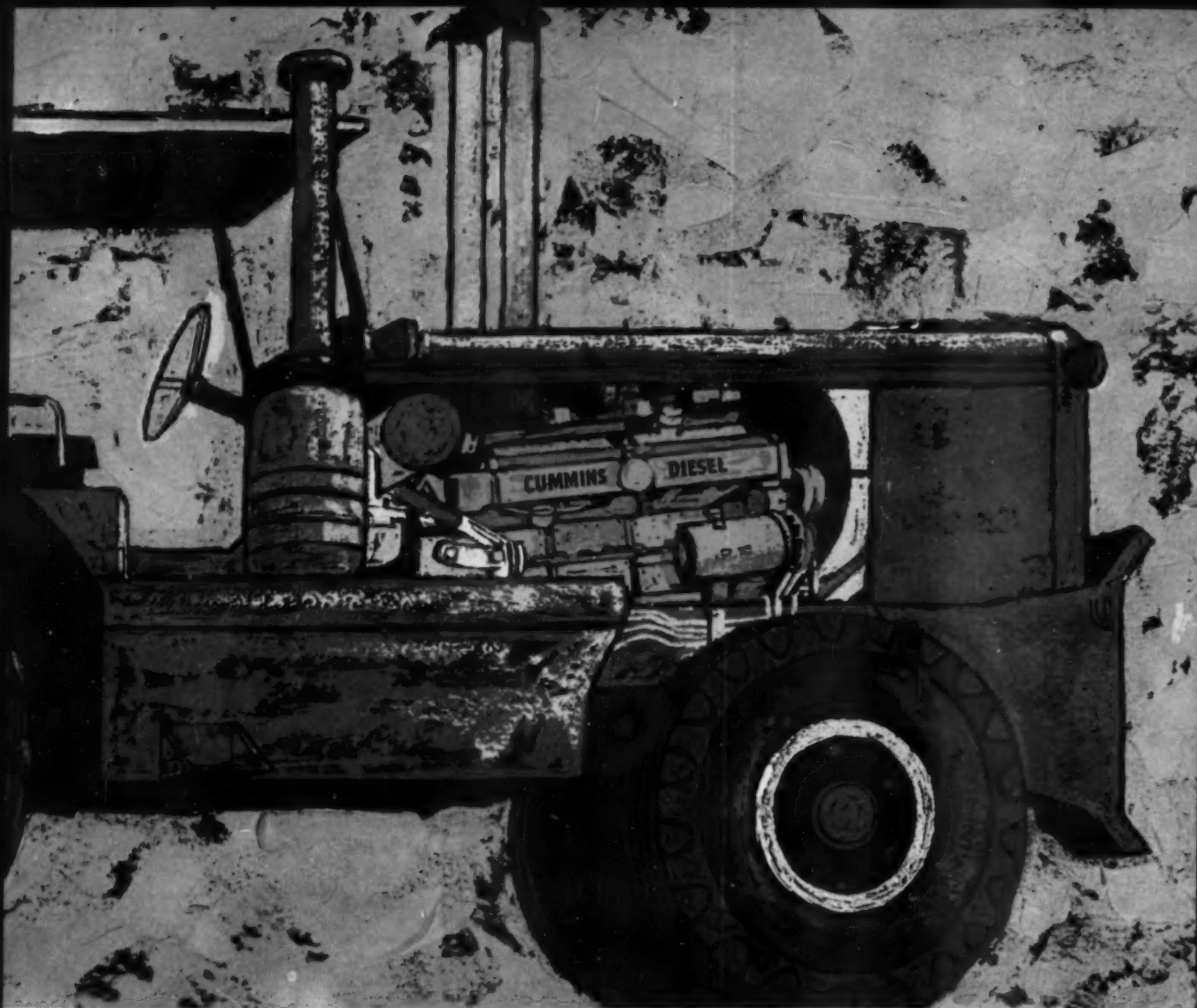
Cummins has proven these 12 cylinder models through 10 years of on-the-job performance. Continuous engine development has produced features that save you money. Wet type cylinder liners, for example, permit quicker, less costly repair. The PT Fuel System is fool-proof and trouble-free. Cummins Dirt Proofing provides positive protection against the entrance of grit and abrasives.

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# GIANT IN GLEN CANYON

**Diesels Speed Construction of 700 Ft. Concrete Dam;  
Will Be Second Largest in United States and  
Is Key Structure in \$1 Billion Colorado River  
Storage Project of Bureau of Reclamation.**

By L. H. HOUCK

**D**IESEL-powered shovels are digging into the red Navajo shale of one of America's last frontiers. Diesel-powered dump trucks speed heavy loads over trails that once marked the precarious domain of the lonesome coyote. Diesel-powered hoists speed men and materials up and down the sheer 700 ft. walls of Glen Canyon on spider webs of steel cable. Expertly engineered cable-ways from huge steel towers span the 1200 ft. from rim to rim that once required a 225-mile jeep trip. Diesel-made compressed air drives drills with glass-hard bits into tunnel faces as diversion passages are being blasted inside forbidding canyon walls. One hundred years ago, J. C. Ives, U.S. Army, reported: "Ours is the first, and will doubtless be the last, party of whites to visit this locality."

Glen Canyon Dam, a key structure in the \$1 billion Colorado River Storage Project of the Bureau of Reclamation, is rising 700 ft. from the bed of the Colorado River, between sheer sandstone walls in the desolate waste of the Kaibito Plateau on the Navajo Indian Reservation in Arizona. The giant water conservation dam and reservoir will open up a vast isolated area of Western U.S. for the enrichment of the nation. In one of the least accessible, most sparsely inhabited areas of the country, Glen Canyon is the key that will unlock a 110,000 sq. mi. area of potential riches in agriculture, industry and recreation. Glen Canyon Dam will be the second highest in the U.S. and fourth highest in the world. It is located 12 miles downstream from the Utah border and 15 miles upstream from Lee's Ferry. Access to the area imposed major problems. Flagstaff, Ariz., the closest railhead, is 135 miles south of the damsite and Marysville, Utah, the second nearest railhead, is 200 miles away via Kanab, Utah, the nearest town. The dam lies in one of the most spectacular cuts of the Colorado River in an area marked with cliff-edged mesas, narrow steep-walled canyons and isolated buttes, where the only inhabitants are a few ranchers and scattered Indian families.

Glen Canyon Dam was authorized by Congress in

Public Law 485 which was signed by President Eisenhower on April 11, 1956. This project alone represents the largest sum ever authorized by Congress for the Bureau of Reclamation—\$325 million—and basic work of the project is to regulate the erratic flow of the hellcat Colorado which is fed by melting snow high in the Rockies. It will afford a constant flow of water for power, domestic use and irrigation. The dam will form a 28,000,000

acre-ft. reservoir when full, extending 186 miles up the Colorado almost to the mouth of Wyoming's Green River. First major construction contract was awarded to Mountain States Construction Co., Denver, for construction of the west diversion tunnel, for \$2,452,340. This tunnel is a tapered opening 2,740 ft. long with a diameter of 43 ft. 6 in. in its upstream portion and 46 ft. 6 in. in its downstream portion. Major contract—the

Looking downstream at Glen Canyon, the storied Colorado river, noted for its murderous white water rapids, is deceptively calm in Glen Canyon. Middle right at river edge cut out progresses the right hand key for the 5,063,000 cu. yd. concrete dam which will rise 700 ft. from the canyon floor. Upper background—highest and second largest steel bridge of its type being constructed across canyon. It is 700 ft. above level of water and 1,271 ft. long.







Marion 4 cu. yd. shovel, loading International Payhauler 95. Marion is powered with Caterpillar D-375, has Donaldson air cleaner and Commercial fuel filter. Payhauler 95 is powered with NRTD Cummins and uses Allison torque converter and transmission.

Following loading, the Payhauler 95's move to dump at bottom of Glen Canyon.

biggest competitively bid job ever let to a single contractor—was awarded to Merritt-Chapman & Scott Corp., New York, for dam, spillways, east 2,980-ft. diversion tunnel, outlets and a hydro-electric power plant, for \$108,000,000, with completion date set for seven years from date of contract—April 29, 1964.

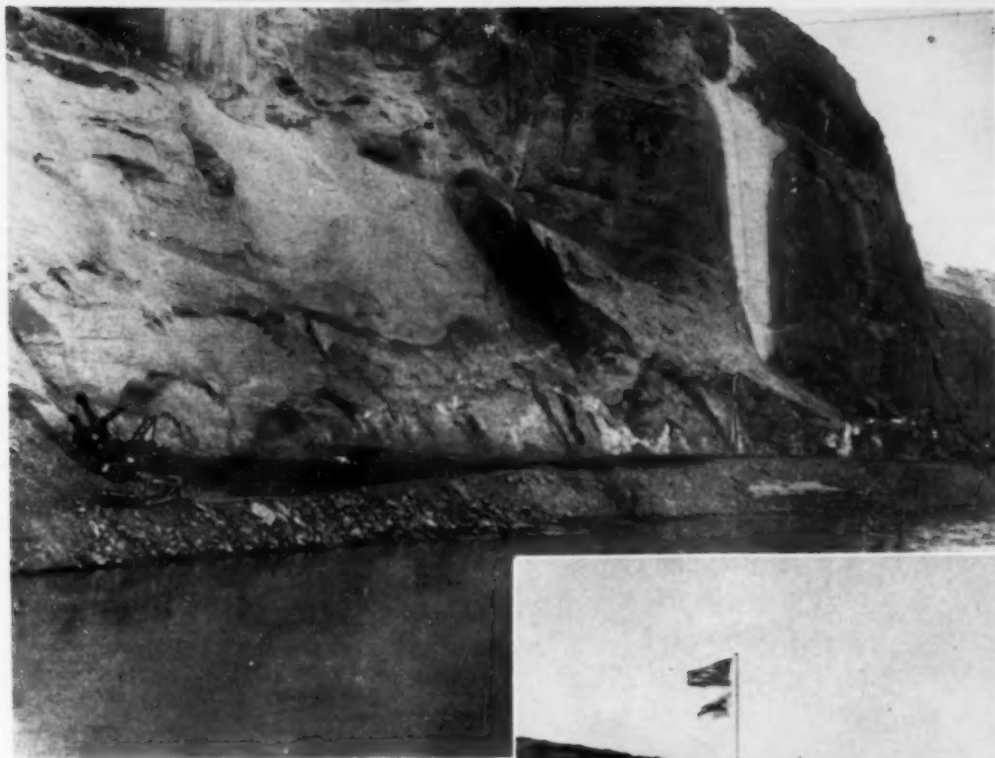
Only 865 ft. downstream from the damsite, construction has been completed on a steel bridge across the canyon—the highest and the second longest of its type in the United States. A contract for this single span steel arch, 700 ft. above the water level of the Colorado, 1,271 ft. long, was awarded in January 1957 to Kiewit-Judson-Pacific Murphy, Emeryville, Calif., a joint venture, for \$4,139,277. It is scheduled to be opened late in January, 1959. This bridge will carry a 30 ft. reinforced concrete roadway and a 4 ft. sidewalk on each side. Here are some of the quantities that faced the prime contractor. Common excavation for dam and power plant, 985,000 cu. yd. Rock excavation 1,650,000 cu. yd. Spillway excavation, 950,000 cu. yd. Excavation in tunnels, 314,000 cu. yd. Concrete required in dam, 5,063,000 cu. yd. with another 570,000 cu. yds. going into powerhouse, tunnels and structures. Crest length of the concrete Glen Canyon Dam is 1,500 ft., and its height of 700 ft. is only 26 ft. less than Hoover Dam. Both pre-cooling of aggregate and an embedded system of cooling pipes will be required in placing mass concrete. Other interesting dimensions include crest width and roadway, 35 ft., base width 300 ft. Maximum discharge through spillways is 276,000 sec. ft. Capacity of the power plant will be 900,000 kw., from 8 units of 112,500 kw capacity each, driven by eight 155,500 hp water turbines. The power plant is being constructed 400 ft. downstream from the axis of the dam.

First job for Merritt-Chapman & Scott was to level off a working area on the rim of the canyon for its field headquarters—offices, storage yards, concrete plant, maintenance shops and housing facilities for employees. A fleet of International TD-24's with International Payhauler 95 dump



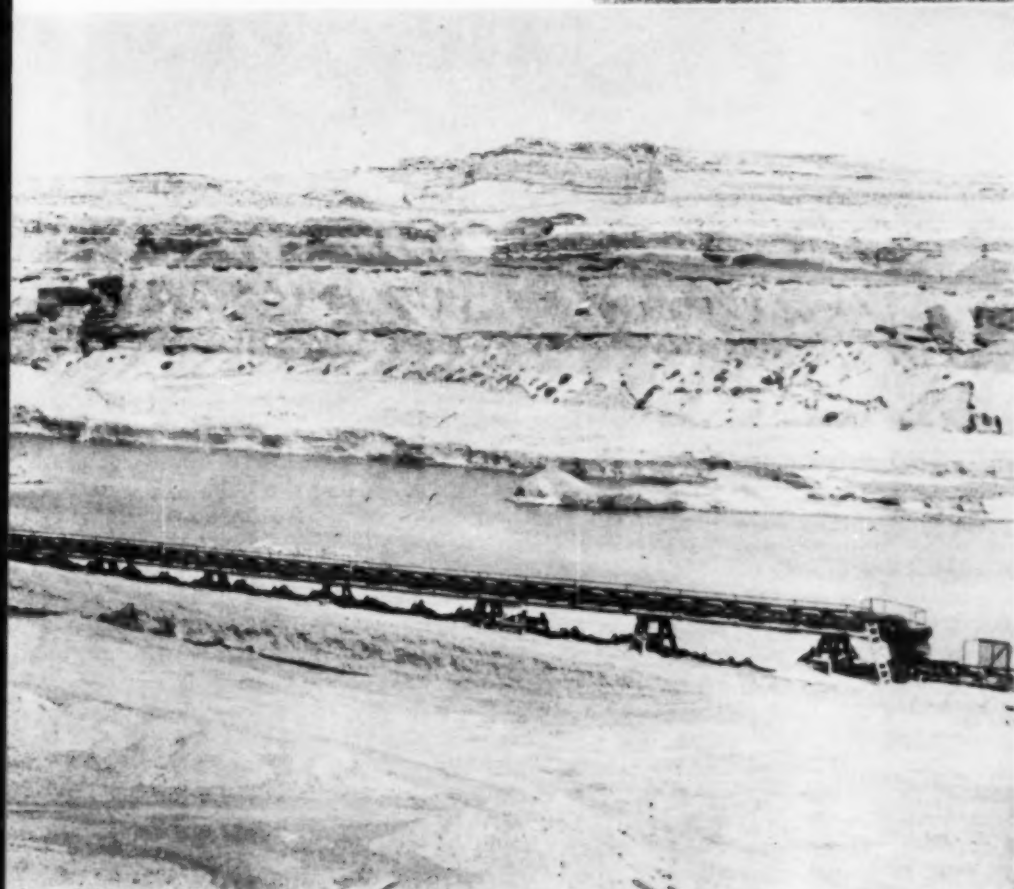
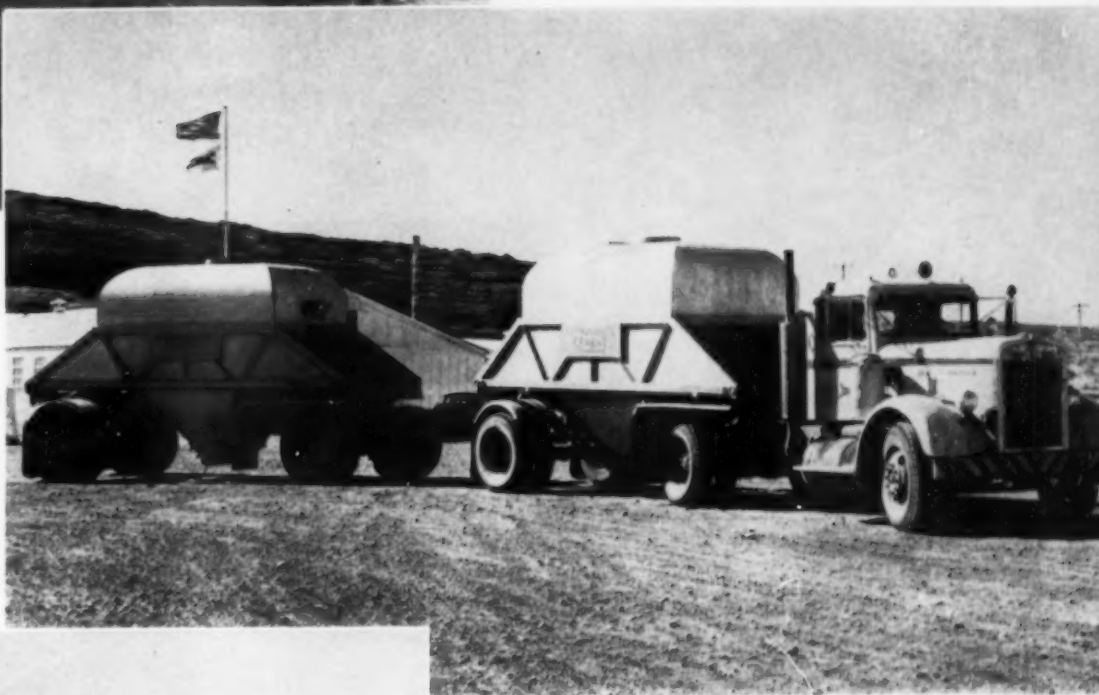
trucks attacked famous Beehive Rock. Assisting on topside was a Marion 93-M, 21½ cu. yd. shovel, with GM diesel. Other equipment moved in as soon as it arrived at the job and Merritt-Chapman & Scott were soon working in the bottom of the canyon, dropping its trucks and equipment down from cable-ways. Construction of a townsite to house workers was started and is well on the way. Page, Ariz., 2 miles east of the damsite, will have a top population of 10,000. A 25-bed hospital has been completed and permanent housing, shopping facilities, administrative buildings, schools, sewer and water, recreational and other facilities are now being constructed. Electric power for Page and for offices, night lighting and for an electric gravel plant, is temporarily being provided by the contractor. Power house was set up on the west rim and initial installation was four Fairbanks-Morse 12 cyl., opposed piston 38D8½, 2 cycle, operating at 720 rpm, turning 1700 kva Westinghouse generators. These engines use Air Maze air cleaners, Bowser lube strainers, Nugent fuel filters and Bowser oil filters. Generating capacity of the four engines was derated due to altitude of 4000 ft., at 5100 kw. The power plant's capacity is now being increased to 16,000 kw by the addition of ten diesels, each generating 1103 kw. These engines were on the job and were in the process of being installed.





▶ Cutting right hand key for dam as viewed from across the Colorado river, showing two Marions loading and a Caterpillar D9 dozer working in foreground. Cable tower and suspension catwalk at upper far right.

▶ Bulk cement is hauled to the job by Kenworth tractors pulling two Trailmobile bottom dump trailers holding 75 barrels of cement each. Kenworth is powered with Cummins NTO-6-B, turbocharged 262 hp Cummins diesel with Vortex air cleaner, Fuller transmission, Timkin driving axle.



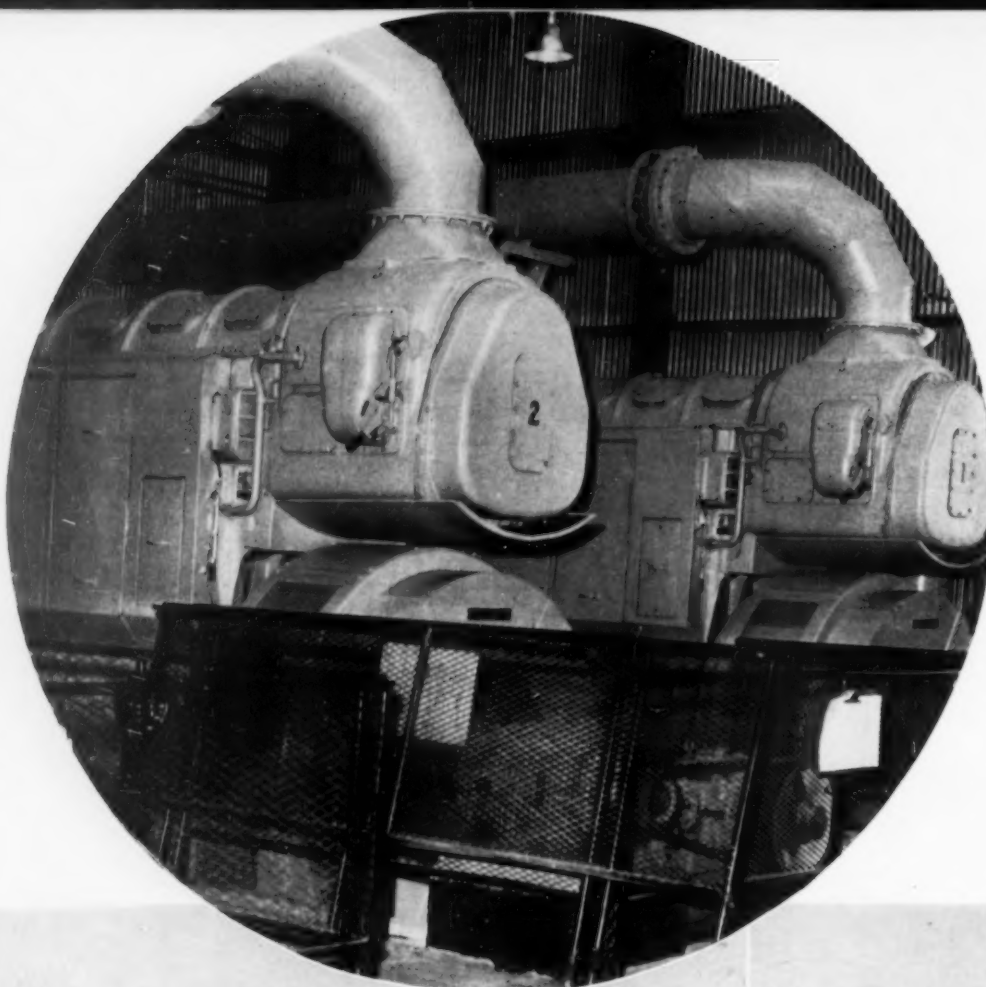
Besides supplying power for town of Page, the contractor was required to set up and operate a complete concrete plant, now under construction, and a complete gravel plant to supply aggregate for the concrete. Aggregate supply was quite a problem and government engineers decided best source was from government owned property on Wahweap Creek, 7 miles from the damsite. Here an intricate washing, grading and blending plant electrically operated from the power plant was set up. This plant is now producing 220 tons/hr. delivering five classifications and blending two. About 40 per cent of the input from Wahweap Creek is waste. Input excavation is handled usually by one or two draglines for the present size of

the plant. More will be required as the gravel plant will be doubled in size before it can supply sufficient quantity of aggregate for the cement plant when pouring gets underway. A Lima 2400 with a D-397 Caterpillar engine was loading to a series of long conveyor belts which transmitted the input gravel and rock to the main plant. At the plant a Marion 43-M truck crane with 4-71 General Motors diesel handled erection of additions to the plant. Cement was being brought in and stockpiled by tandem Trailmobile trailers hauling a total of 150 barrels of cement, pulled by a Kenworth AK-5 with a turbocharged Cummins 262 hp diesel engine.

Main job in the canyon was excavation of keys for the concrete arch dam which will set in the river with the bow upstream, plus excavation for tunnel and work on canyon walls. At the bank of the river in the bottom, two diesel powered shovels, loaded out a fleet of 20 International Payhauler 95's. These trucks have Cummins diesels

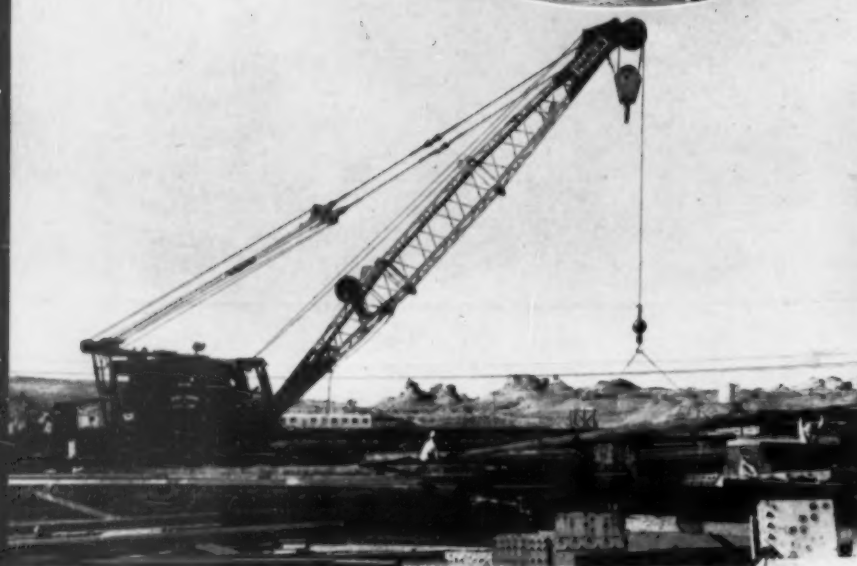
◀ Lima 2400 dragline with D-397 Caterpillar engine, loads gravel conveyor line at Wahweap Creek, 7 miles from Glen Canyon, where one of the largest gravel plants in the country washes and classifies gravel into 5 grades.





worked in the yard and between railhead at Flagstaff, 135 miles south. They were equipped with Spicer 8251 and 8341-A transmissions and the two driving axles were Timkin. These were model SFDD 4600 trucks. A paved road has been completed from Kanab, Utah to the damsite, a distance of 72 miles. Paved roads have also been completed from U.S. 89 to Page so that the damsite now can be reached from either side of the canyon. Private enterprise is being encouraged at Page where the government is building a warehouse at a cost of \$358,000. Contracts have also been let for permanent air conditioned homes, a water supply purification system, LP gas system. Three high lift pumps in the water system are being supplied by Allis-Chalmers and three raw water pumping units are supplied by Aurora Pump Division of the New York Air Brake Co. These pumps are electric motor driven with power from the main diesel plant.

Two of four Fairbanks-Morse opposed piston diesels drive 1700 kva Westinghouse generators. Merritt-Chapman & Scott Corp., general contractors, furnish power for their own electrical equipment and temporarily supplies the new town of Page, Ariz.



43-M Marion truck crane working in steel storage yard, leading structural steel in truck for use in cement plant. Power is GM 4-71 diesel.



Hauling structural steel on a Fruehoff low-boy trailer from the steel yard is this RFD-411 International with NRT-6-B Cummins.

and Allison torque converters. The shovels were a Marion 111-M, 4 yd., dipper, powered with Caterpillar D-375 and a Marion 101-M, 3 yd. shovel with Cummins diesel. A Caterpillar D9 kept the loading area clean, and a Euclid dump truck converted by welding into a 2000-gallon sprinkling truck, was powered with a Cummins diesel. On the opposite bank 500 ft. above the bottom, an International TD-24 was eating its way down the canyon wall, in cutting out the left hand key sector. Other shovels and cranes included two 43-M Marion truck cranes, a Lorain MC-524 30-ton crane, three Marion 111-M's, a 101-M and a 362-M. Others were a Lima 1601 with Cummins V-12 and a 2400 Lima, and a 3500 Manitowoc. The tractor fleet consisted of ten TD-24

Internationals with straight transmissions and four Caterpillar D9's, two with straight transmissions and two with Twin-Disc torque converters. Main items in the air compressor spread included six Joy 600's with GM 6-71 diesels, four Joy 630 with International diesels and four Ingersoll-Rand 600's with GM 6-71 diesels. Besides the Euclid sprinkler truck, a LaPlante Choate truck with Cummins diesel was converted into a 3000 gal. sprinkling truck. Utility trucks included four Mack B-62 Thermodynes with Mack transmissions.

Movement of material and equipment from railheads to job site were handled by three International transports, with Cummins 335 hp diesels, and pulling appropriate type trailers. These

Recreation and tourist business for a barren area staggers the imagination. It is in the area of five national parks and monuments which usually pulls 5,000,000 visitors annually. When highways are completed and the bridge over the canyon is opened, Bureau engineers estimate that 600,000 visitors annually will visit this area where solitude has reigned for so long. Project engineer for the Bureau of Reclamation, is veteran L. F. (Lem) Wylie, who has his offices at Kanab, Utah.

Operations of Merritt-Chapman & Scott at Glen Canyon are under the overall supervision of William Denny, executive vice president in charge of Merritt's Construction Department. Allen R. Bacon, project manager, heads up the field staff.





This Manitowoc 5 1/2 yd. shovel carves out benches for a dragline at Hart & Hart Coal Co. It is powered with a Cummins VT-12, 600 hp diesel using a Clark torque converter.

## MORE POWER FOR MINES AND QUARRIES

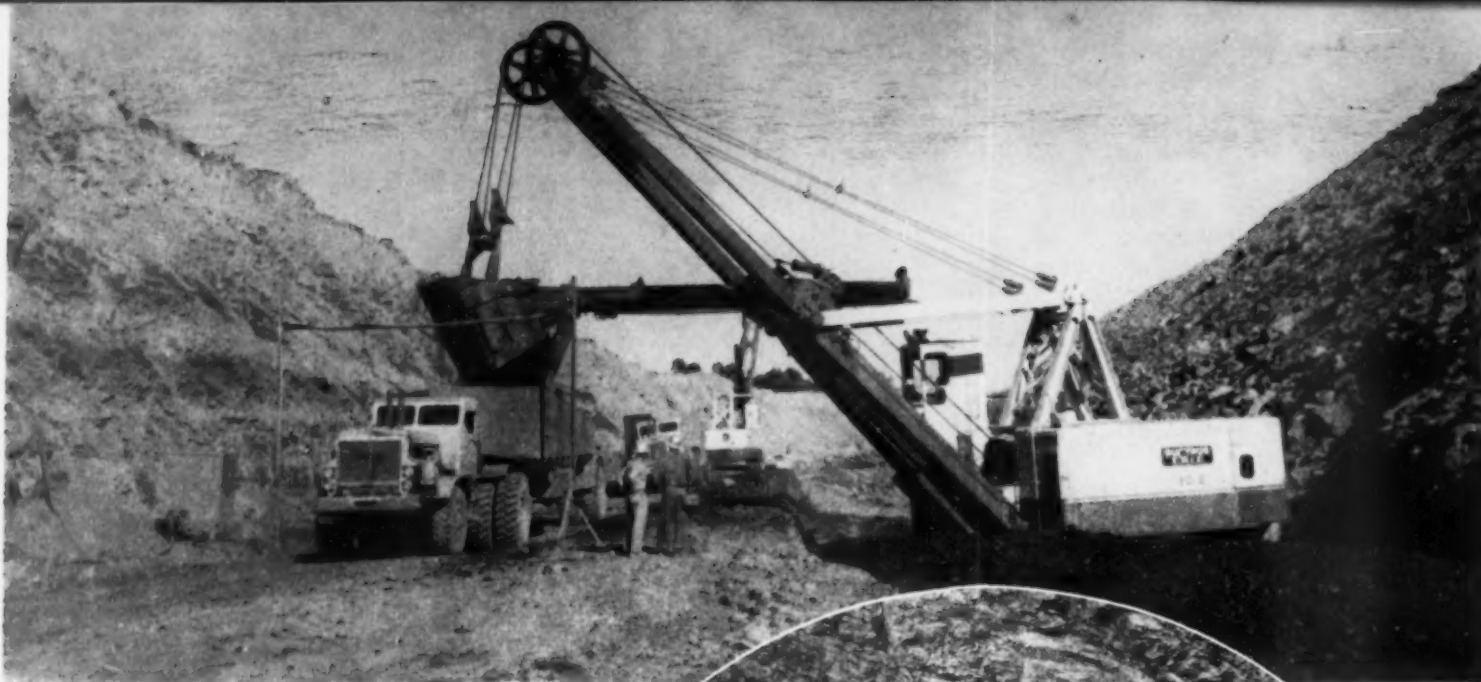
**Higher Horsepower Diesels Become More Important to Strip Mining and Aggregate Production As Increased Efficiency In Moving Material Offsets Higher Operating Costs.**

By ROBERT E. SCHULZ

**F**ROM the vast coal fields of western Kentucky to the huge rock quarries of northern Illinois, operators are continually looking for ways and means of holding the lid on production costs. Certainly this is not a new problem, but it is one that has continually grown in importance over the last decade and is being sharply reckoned with by producer and equipment builder alike. What was several years ago recognized as

a trend toward larger, more powerful loading and hauling equipment is now becoming a fairly well established pattern among the more progressive ore and mineral mining companies and producers of rock products. Typical of these industries, the development of this new equipment has been accomplished by mutual cooperation all the way from the drawing boards to the rock-ledge pits. It is here in the pits, however, and the haulage

roads leading to them that the big payoff is taking place and the big power behind it is—diesel. Over the last several months, I've had the opportunity to visit some of the large and small producers in the midwest and this, coupled with reports in from other parts of the country show the surge of new high horsepower diesel equipment entering service. Of the diesels many are V-types, and turbocharged engines are equally prominent.



↑ Gibraltar Coal Corp. near Central City in western Kentucky operates 8 Euclid 24-TDT 51 ton dump bottom tractor-trailer coal haulers, each powered by Cummins NVH 12 cylinder diesels with Fuller Transmissions.

One of the most striking examples of cost reduction in hauling coal from pit to tippie is that recorded by Hanna Coal Co., Division of Pittsburgh Consolidation Coal Co., at its Georgetown No. 12 mine in eastern Ohio. Here, lying under 90 ft. of overburden in most areas, is a 4½ ft. seam of Pittsburgh No. 8 and 9 bituminous type coal. The job of stripping is tremendous and is assigned to giant shovels, whose buckets dwarf a regular passenger car. Following stripping, the task of hauling the coal to tippie is assigned to a fleet of 27 Euclid TDT-24's pulling 60 ton Hanna bottom dump coal haulers. These 27 units were added over the last six years with the first going into service in 1953. As the new Euc's were added, the company's existing fleet of 18 ton rear dump trucks were taken out of hauling service and assigned to general purpose duty at the mine site. Comparison of records show that the 18 ton Euclids in 1953 were averaging 11 miles a round trip from pit to tippie at 26 cents per ton-mile. Seams at No. 12 are now being worked as far out as 11 miles from the tippie necessitating a round trip of 22 miles; however, with the 60 ton haulers, the majority of which are powered with Cummins NVH 450 hp diesels, the cost per ton-mile has dropped to 3½ cents. This cost reduction shows the savings possible through the proper application of dieselized equipment. Carl Rogers, Hanna maintenance superintendent and who has \$47 million worth of equipment under his authority, said his company found it necessary to devise more efficient production methods because "the price of coal has been going down over the last 10 years while operating expenses increased. We had to reduce costs in order to stay in business."

Hauling capacity, of course, depends a great deal on the off-highway or private roads that must be traveled. Ohio River Collieries, for example, has just placed in service the first of a fleet of 30 ton dump trucks. Their coal haul is a difficult opera-



↑ Above, two of Material Service Corporation's Dart trucks head for the crusher with their 50 ton loads, as another (right) is loaded in the quarry. All of the eight Darts in service in the company's Thorton quarry are Cummins powered. The units replaced twelve 27 ton trucks.

tion for the roads, for seven miles, twist and turn atop mountainous piles of overburden. Grades vary from "kind of steep" to one long and seemingly vertical hill of 22 per cent grade. The new truck, a Diamond T, as are the others on order, represent an extensive fleet modernization program by Ohio River Collieries. General Manager Tony Gentile, who has charge of the entire Ches-hire operation is enthusiastic about the new addition to his "work force." He said, "With the new truck we haul bigger payloads, achieve faster work cycles and realize a larger return on our equipment investment." Power plant for this and the other new trucks is a Cummins supercharged NHRBS diesel developing 320 bhp.

Presently one of the largest coal haulers in service is an 80 ton unit operating at the Midland Electric Coal Co. mine near Farmington, W. Va. According to this company, the hauler has carried 90 and even 100 tons per load without difficulty.





Power for the hauler is supplied by a 450 hp Cummins NVH-12 engine. Indicative also of the pattern in this industry was the recent delivery of six large aluminum coal haulers to the Aluminum Company of America who will lease them to the Squaw Creek Coal Co. in southern Indiana. Each of these bottom dump haulers holds nearly 60 tons of coal and Alcoa has stated that the lighter weight of units gives 5 tons added payload capacity. A 335 hp Cummins engine, in a heavy duty tractor, supplies power for each trailer.

The same problem of achieving greater production at lower operating costs also faces the rock products industry. Material Service Corp. of Chicago turned to heavier trucks and equipment to find its solution with the result that man-hour production was increased 30 per cent in a three year period. This production increase took place at the corporation's Thornton, Ill. quarry when hauling turned from rail to diesel trucks and the size of the crusher was increased. "With the bigger equipment and the mobility of trucks, we got greater production per man-hour with the same man-power and thus reduced costs," said Alfred Rodriguez, assistant to President Irving Crown. The emphasis on bigger equipment is illustrated by the management shifting twelve 27 ton rated trucks from quarry work to fill-hauling service and replacing them with eight 450 hp Cummins powered Darts. Instead of carrying 27 tons, the Darts transport 50 tons, or to put it another way, eight trucks do the work 12 had done previously.

Not only are larger, more powerful trucks being used, but equally important, many operators are repowering their shovels and manufacturers are making more power available in an all-out effort to speed loading cycles and thus keep pace with the larger equipment it serves. One of the best examples of the advantage of increased horsepower is found at Hart & Hart Coal Co. in west-

ern Kentucky. In 1953 Hart placed in service a Manitowoc model 4500, 5½ yd. shovel powered with a Cummins 600 hp VT-12 engine. After three years of service and with production demands constantly increasing, the company, through turbocharging, raised the engine rating to 600 hp and in doing so, reduced the shovel's cycle time from 30 to approximately 20 seconds.

All haulage and loading equipment, of course, does not require greater horsepower and this will continually be dictated by production requirements, maneuverability and general utility. However, where conditions permit, the use of larger equipment with higher horsepower is continuously paying off by giving the operator lower costs for each ton of material moved.



Here is one of Hanna Coal Company's 27 Euclid 24-TDT tractors which pull 60 ton bottom dump coal haulers. Majority of the tractors are powered with Cummins NVH 450 hp diesels and Fuller RoadRanger 1150 transmissions. Donaldson air-cleaners, Purolator fuel oil filters and Luber-finer lube oil filters are used on these tractors.

This 600 hp Michigan is shown stripping uranium overburden at Lucky Mac Uranium Mine in Riverton, Wyo. The unit is owned by Utah Construction Co. Power is provided by a 600 hp Cummins VT-12 engine.

This bottom-dump hauler is among the largest aluminum trucks in the world. Six of this type are operated by Squaw Creek Coal Co. with power supplied by Cummins 335 hp engines.







## MECHLING BARGE LINES ADDS A NEW ONE

**Starting With The *Sharon Lee* In 1954,  
Adding The *Margaret C* In 1958.**

By DOUGLAS SHEARING

**A**NOTHER milestone in the history of the A. L. Mechling Barge Lines Inc., Joliet, Illinois, was made when the tug, *Margaret C* went into service last year. The *Margaret C* is the second tug to be placed in the New Orleans to Tampa service by Mechling. In 1954 the *Sharon Lee* was built for this run, but the increased tonnages made it necessary to augment this operation.

A. L. Mechling Barge Lines Inc. traces its beginning to the 1920's when A. L. Mechling, President of A. L. Mechling Barge Lines Inc. owned a gravel pit near the old Hennepin Canal in Illinois and availed himself of the cheaper and more convenient water transportation to deliver his gravel products to customers on the shores of the canal.

By 1946 the operations of the A. L. Mechling Barge Lines Inc. had expanded to where bulk petroleum products were carried from ports in Indiana, Illinois, Missouri and Texas for delivery in various points in Alabama, Illinois, Indiana, Iowa, Kentucky, Louisiana, Minnesota, Missouri, Ohio, Pennsylvania, Tennessee, Texas and Wisconsin. A. L. Mechling Barge Lines Inc. was incorporated in December 1947. It has grown to where today the company operates a fleet of 13 diesel towboats on the Mississippi River and its tributaries, two diesel tugboats on the Gulf of Mexico and more than 175 barges of various types. Again in 1952, another expansion of the A. L. Mechling Barge Lines Inc. was made to handle the transporting of grain and other com-

modities to include the ports of Brownsville, Texas and Tampa, Florida.

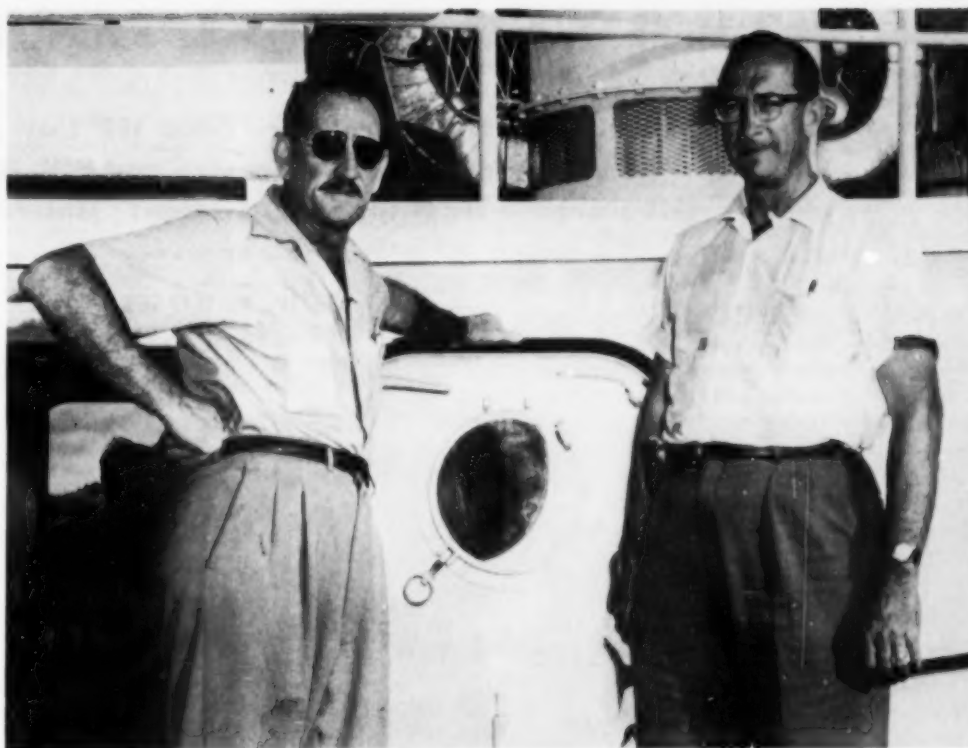
During the years 1952 and 1953, tugs were chartered for the New Orleans to Tampa service. In 1954, Mechling acquired the tug, *Sharon Lee*, designed and powered to operate most efficiently on the Intracoastal Waterway. The *Sharon Lee* is a 100-foot General Motors diesel-electric tug. The main propulsion machinery consists of a 12-cylinder, 2-cycle model 278A General Motors diesel engine and is rated at 1000-shaft hp. Since 1954, the cargoes have increased so that at the end of last year, 26 seagoing barges were in the New Orleans to Tampa service. After the service was established, it was found that the more direct route



from Tampa to Ship Island on the Gulf of Mexico was much faster than utilizing the Intracoastal Waterway. The newest tug, the *Margaret C*, was designed and powered to operate most efficiently on the open water of the Gulf.

The *Margaret C* is 103-feet long and was designed by the marine design section of the Cleveland Diesel Engine Division of General Motors and was built at the Gulfport Shipbuilding Corporation at Port Arthur, Texas. The main propulsion machinery consists of one 12-cylinder, 2-cycle model 567C General Motors diesel engine which delivers 1200-shaft hp at 800-rpm. The engine drives a three bladed propeller through a Wichita clutch

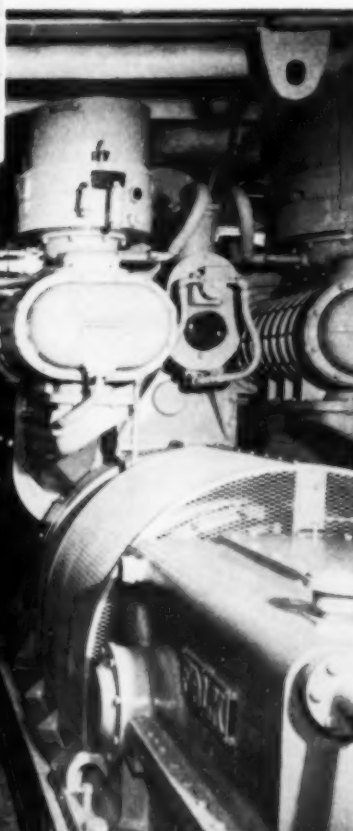
The *Margaret C*, latest addition to the Mechling Barge Lines, is powered with a 12-cyl. 1200 hp Cleveland Diesel.



Captain Russell Dickinson and Donald Mechling, Vice President, A. L. Mechling Barge Lines Inc.



Port side of the engine room of the *Margaret C*, showing the main Cleveland Diesel unit, Delco-Detroit Diesel auxiliary generating sets, Marquette governors, and Air-Maze filters. Wichita slipping clutch with Falk reverse and reduction gear in foreground.



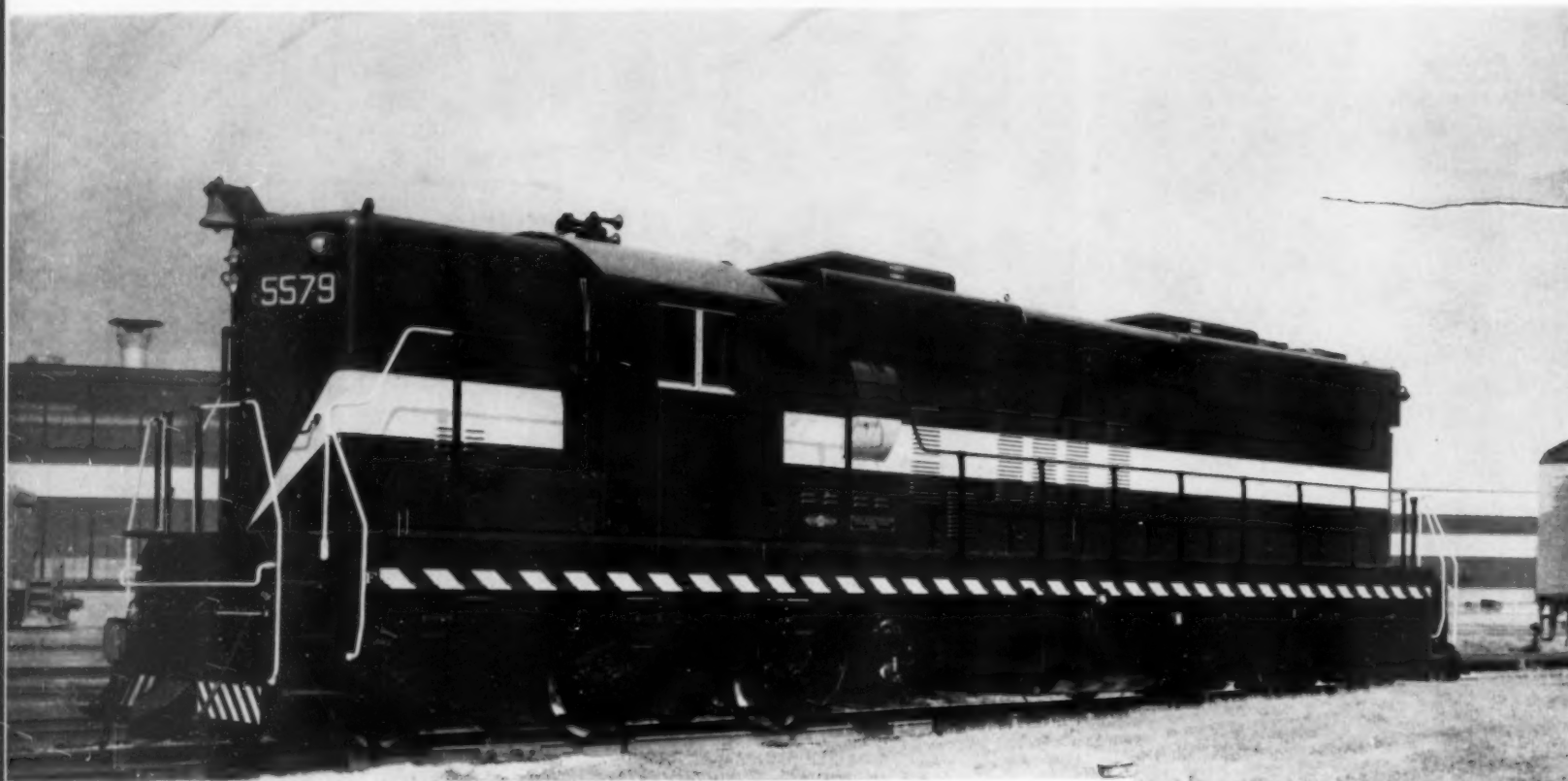
and a Falk 3 $\frac{3}{4}$ :1 reverse-reduction gear. The auxiliary power is supplied by two model 71 General Motors diesel engines. One diesel-driven generator is a 60-kw, 450-volt, 60-cycle set, the other is a 40-kw, 450-volt, 60-cycle set.

The outstanding feature of this tug is that it is the first tug in the Gulf area to be equipped with the Wichita slip clutch. The clutch has been successfully used on the East Coast and Great Lakes for almost one year. The Wichita clutch allows maneuvering comparable to that of electric drive. After nearly six months of continuous service, Captain Russell Dickinson said that the operation of the *Margaret C* had "surpassed" nearly all expectations. He pointed out that because of "more horsepower, more length and depth, this tug had great ability in a head sea". With the 1200-shaft hp Cleveland Diesel engine, the Captain said he was able to "put more horsepower to the shaft and keep it turning at 750-rpm all the time". Captain Dickinson went on to say "It must be borne in mind that while the *Sharon Lee* is an excellent open water tug, each tug was powered and built for a specific type of service—the *Sharon Lee* for service on the Intracoastal Waterway, and the *Margaret C* for service on the open waters of the Gulf of Mexico. On one trip the *Margaret C* and the *Sharon Lee* left Tampa at the same time with identical tows. The *Margaret C* made the trip of 355 nautical miles from Tampa to Ship Island in 60 hours, while the *Sharon Lee* required 72 hours. On this trip the *Margaret C* used less fuel than the *Sharon Lee*. The reason for this better performance was due to the greater horsepower and design of the *Margaret C* for exclusive open water towing."

# TWO NEW DIESEL LOCOMOTIVES

**Electro-Motive Introduces 2400 HP Unit for Domestic Fast Freight Hauling Service and 800 HP Unit for All-Purpose Duty for "Lightweight" Railroads Overseas.**

*By W. L. BODE*



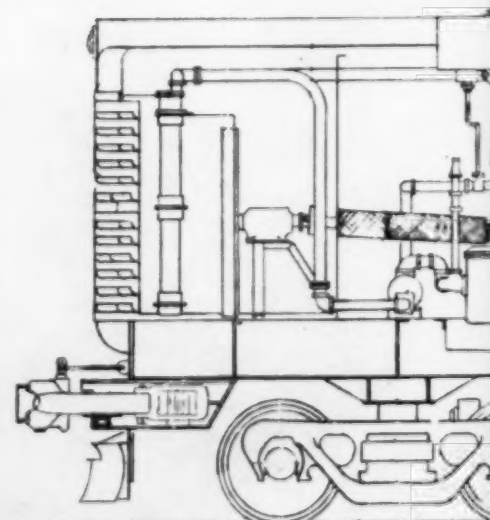
**T**WO new types of diesel locomotives have been announced by the Electro-Motive Division of General Motors. One is aimed at aiding United States railroads to materially speed up the movement of high tonnage freight trains. The other extends the economic possibility of dieselization to small railroads outside Europe and North America, mostly in the non-manufacturing countries in the warmer climates of Asia, Africa and South America. These railroads now operate approximately 50,000 old and costly steam locomotives which is approximately half of the locomotives in operation in the world outside the United States, Canada, Mexico and Russia.

The new domestic type locomotive, designated the SD24 (Special Duty 2400 hp), has been designed around the possibilities found to exist in the new turbocharged version of the GM 567 series diesel engine, the prime mover for all Electro-Motive locomotives produced since 1938. The highest domestic locomotive propulsion rating of the 567 engine heretofore has been 1750 hp. Production of the new models will begin in the second quarter of 1959. "A prototype of the SD24 has been under tests for several months", said N. C. Dezen-

New SD24 General Motors diesel locomotive for fast movement of long heavy freight trains is powered by the new turbocharged, 2400 hp, series 567 engine.

Drawing of the new GA8 General Motors lightweight road locomotive shows 800 hp, 567-C power plant, traction motors hung from bottom of underframe instead of in trucks as in conventional Diesel-electric locomotive design, and transmission to driving axles through shafts and bevel gears from the two motors.

dorf, GM vice president and general manager of EMD. "The tests have resulted in a demand from our railroad customers that we get it into production as rapidly as possible in order to haul, not more than the present heavy tonnage trains, but to move this already high tonnage faster with fewer locomotive units and hence with less expense and greater return on investment. A number of the larger railroads already are publicly embarked upon programs to materially speed the movement of long, heavy trains across the continent with currently produced General Motors locomotives. Their reaction to the SD24 indicates that we have produced a new tool which will make this a highly useful service to the nation and insure more profit-





able operation for the railroads. The SD24 does not replace any of the present locomotives in the Electro-Motive line," Dezendorf stated. "It adds a piece of motive-power to cover an important but highly specialized need on some railroads. Tests indicate that the new locomotive can handle heavy tonnages on a level grade approximately 16 per cent faster and up a 1 per cent grade 25 per cent faster than existing road locomotives, which are designed for a wider range of service.

The SD24 is the first railroad application of the newly developed turbocharged 567 engine which is known as the 567-D. Electro-Motive announced on May 12th that this turbocharged engine will power the new 6000 kw Electro-Motive peaking and reserve generating plant for electric utilities. The new EMD turbocharger, unlike conventional superchargers, is operated by the engine's gear train when the engine is being run at low speed or load. Company engineers point out that two-cycle engines, such as the 567 series, normally use a positive displacement blower to provide air for scavenging of exhaust gasses and charging the cylinders with a supply of clean, fresh air for combustion of the fuel. The positive displacement blower maintains air pressure up to 4 lbs./sq. in. at the cylinder. In the turbocharged engine, however, air is supplied by an exhaust propelled turbine-driven compressor which provides air pressure up to 15 lbs./sq. in. At low engine speeds or load, when there would not be sufficient energy in the exhaust gasses for the compressor to supply adequate air to the cylinders, the compressor is operated directly from the gear train of the engine. An over-running clutch in the gear train allows the turbo-compressor to become free running when the energy in the exhaust gasses is sufficient to drive the compressor faster than the engine gear train will run it. Several design changes of the 567 series engine were required due to the higher loading of the turbocharged version. These design changes have been made in the following areas: crankcase, liner to crankcase seal, piston and rings, piston pin bearing, connecting rod bearing, cylinder heads and valve assembly, cam-

shaft, valve gear, injector, oil pumps and water pumps, and exhaust manifolds.

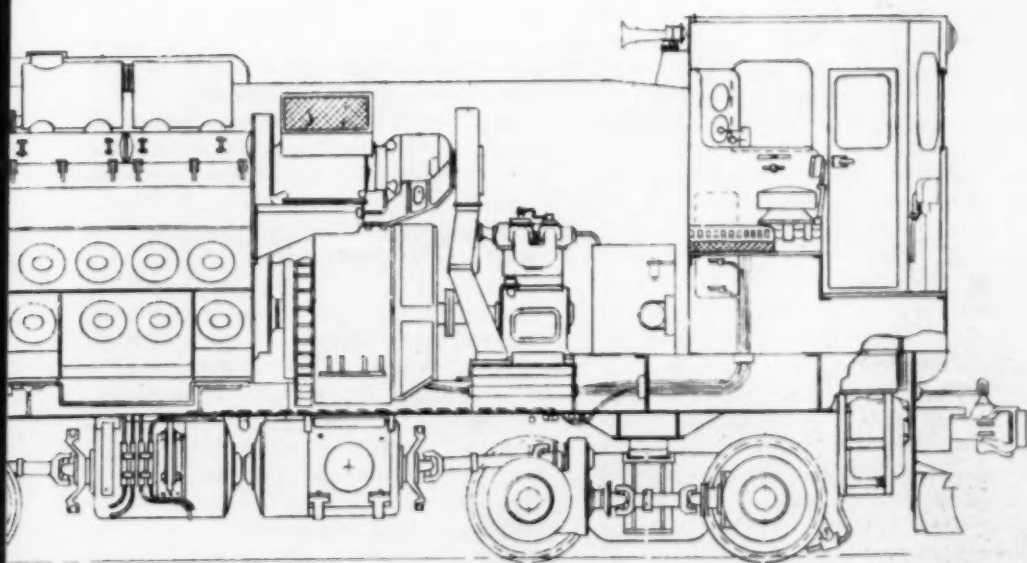
The locomotive is equipped with two fully flexible, three-motor, six-wheel truck assemblies. The controlled floating action of the trucks results in excellent riding characteristics permitting a choice of gear ratios for locomotive applications up to speeds of 90 mph. Dimensions of the SD24 are virtually the same as the SD9, another GM locomotive of 1750 hp and six motors, with the exception that the roof of the new unit is about 6 in. higher. Overall length is 60 ft. 8½ in.; height 15 ft. 2¾ in. and width (over grab irons) 10 ft. 8 in. Total weight on rails, unballasted, is approximately 328,000 lbs. The locomotive can be built to a maximum of 390,000 lbs.

The new export model comes in at the other end of the complete General Motors complement of models covering railroad requirements. The new export model, designated the GA8, is extremely

lightweight road locomotive capable of handling passenger or freight trains and doing its own switching. For this locomotive, EMD is using its 567-C, eight cylinder, 800 hp diesel and the generator and two traction motors are standard models. "While it is primarily designed to meet requirements of the enormous market on so-called 'light-weight' railroads overseas, the new model already has attracted considerable attention among United States railroad men who have happened to see it under construction at the La Grange plant and there has been some preliminary study of applications in this country", Dezendorf said. The locomotive contains a number of somewhat radical innovations in order to fit it to the requirements of the light-weight railroads. The overseas railroads in the category which the new motive power will serve have very light rail and bridge structures. Traffic is so low that locomotives operate not much more than 20,000 miles a year on the average (as compared with the com-



800 hp GA8 General Motors light-weight diesel road locomotive designed for overseas service.



mon 100,000 miles a year for a diesel freight locomotive and 200,000 to 300,000 for a diesel passenger locomotive in North America). The track and bridges are generally old and tunnel and station clearances are small. Most railroads do not have modern shops and cannot afford to install them. "So," Dezendorf pointed out, "Electro-Motive engineers have designed a locomotive to be sold at low first cost and hence can be paid for despite the low annual utilization on these railroads; a locomotive which gets higher utilization because it can handle all three services; is extremely simple to maintain, eliminating the necessity of the roads installing elaborate service facilities which they cannot afford; is extremely rugged and long-lived (because standard components long used in the rugged U.S. locomotives are utilized); has phenomenally low axle loading, despite its high tractive effort ability, enabling it to improve service without overloading tracks.



# DIESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

## Determining Tool and Equipment Requirements

**M**ETHODS used to determine the service shop's tool and equipment requirements will vary with the type of services performed and the types of equipment serviced. The alert manager of a fleet or contractor's service operation, and the manager of a retail service operation, must consider the end results to be expected from the purchase of a new tool, a new machine, or other shop equipment. While many managers have a well planned approach in making the proper selection, others often operate on a hit or miss method and only make purchases— (1) when the equipment wears out, (2) when a salesman comes along with a real good deal, or (3) when the mechanics demand the need of something new. To set forth a guide that will aid in purchasing new equipment, or to replace something that is worn out, damaged beyond repair or, as is often the case, something that has become obsolete, a shop manager should ask himself a number of questions, such as:—is this equipment adequate for the job it is intended for?—is there another make that will do a better job?—will it benefit service volume and shop productivity?—will its use result in higher quality jobs?—will this equipment enable him to operate a more profitable shop?

Important factors that are often overlooked while determining a shop's equipment requirement are jobs often sublet because the department is unable to handle them for some reason or other. Maybe the reason for subletting certain jobs is because of a shortage of trained labor, but very often the likely reason for such situations is the lack of equipment. Examples of such job subletting is farming out generators and starting motors for rebuild; or, as odd as it may seem in today's modern service era, farming out cylinder heads to be reworked. An example of the cost comparison from subletting work and purchasing the equipment to do the job in the shop can be determined from the records of one very large service establishment who was sending out to a competitive shop an average of 60 engines per year for run-in and dynamometer test. The total cost for farming out this work, plus the time and expense for taking

the engines to and from the test facilities would pay for a dynamometer and other required equipment in less than 18 months. Naturally, the competitive operation enjoyed this business for it enabled them to pay-out the investment of their dynamometer test equipment in a much shorter period than they had originally anticipated. Furthermore, they were able to influence a number of customers to deal directly with them for their overhaul and service needs.

A careful analysis of service repair orders will aid tremendously in determining the various types of service jobs coming into the shop and the types of tools and equipment that will enable the operation to efficiently handle its service volume, cut labor costs, and increase the total value of repair orders. When sublet repairs are included in this analysis, the service manager should not overlook the fact that many jobs are passed up because part of the work has been farmed out. Therefore, sublet repair oftentimes does not tell the whole story as it pertains to equipment requirements. The selection of a new tool or piece of equipment should be based upon an actual need. There is one sure way for a service manager to involve the wrath of the top brass and to lose the freedom of being able to purchase equipment to meet his requirements, and that is, to purchase an expensive piece of equipment and have it become a dust collector and never be used. Tools and equipment should be selected on the basis of value to the service operation, and the effects their purchase will have on the end results. It must be remembered that there is very little profit in subletting service work, and the utilization of the department's own labor and equipment is necessary for a profitable operation in today's competitive market. It stands to reason that tools and equipment do become obsolete and must be kept up-to-date. If equipment is kept up to meet the requirements of changing service needs, the variety of jobs that can be handled will often increase and, as a result, shop volume and productivity will increase, or for a retail service operation, customer labor sales will increase. Many tool and equipment manufacturers

furnish additional features that can be added to their present equipment to bring it up-to-date. Some manufacturers even have exchange programs to protect a service operation from obsolescence. Most manufacturers are constantly improving tools and equipment to make them more productive, safer and easier to maintain.

Before equipment is purchased, especially those items that are normally classified as capital equipment, there are certain important factors that must be considered. Some of these considerations are: Does the manufacturer provide installation assistance? Will the manufacturer give a course of instructions for personnel who will be using the equipment? What kind of service does a manufacturer have to keep the equipment in operation, up-to-date, and serviceable for the shop? If effective operation is desired, tools and equipment must be used, selected and properly maintained. There are four basic rules that will apply to any Service Department desirous of keeping its tools and equipment in operation and up-to-date to meet the immediate requirements. They are:

1. Train shop personnel in the proper use and maintenance of tools and equipment.
2. Make scheduled inspections to determine the need for repairs, modifications, or replacements.
3. To frequently analyze the tool and equipment requirements.
4. Keep all tools and equipment up-to-date and properly stored or cared for.

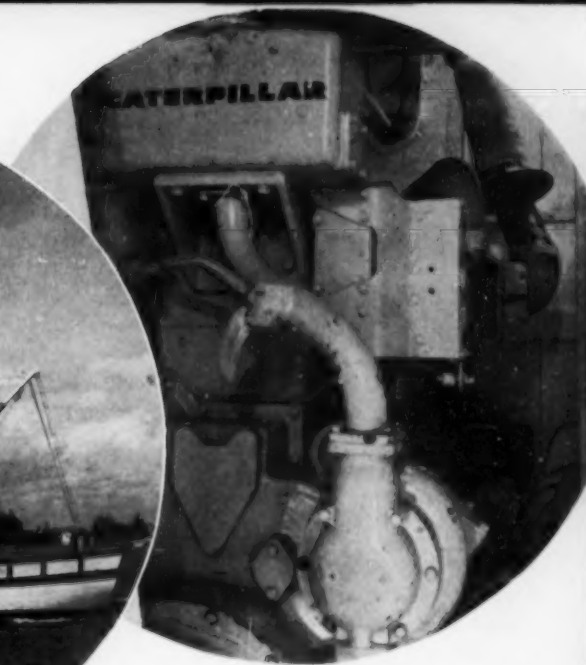
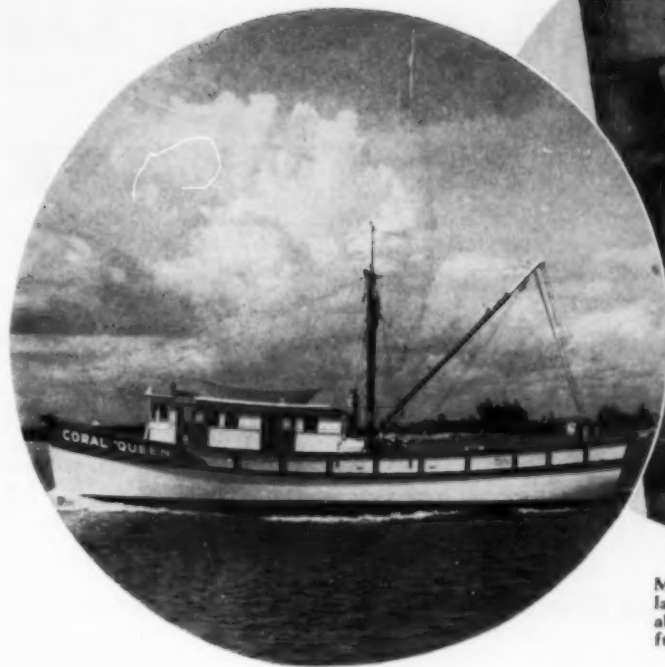
Many of the major engine, truck and construction equipment manufacturers have a service development department which is responsible for recommending proper tools and equipment for their distributors', dealers' and customers' service operations. Generally, the service departments of these major manufacturers are always ready and available to assist in making a tool and equipment analysis, or direct recommendations relative to the equipment needs of a service shop's responsibility for servicing their equipment.



# CORAL QUEEN OF FORT MYERS

By ED DENNIS

**E**conomic necessity of counterbalancing the rising production costs with the faster and larger haul of shrimp calls for larger Florida type trawlers with more diesel horsepower. Since turbocharging increases the horsepower output of an engine without increasing engine dimensions, trawler operators are looking more to this type diesel engine plus an increase in space for storing iced or refrigerated shrimp while at sea. The *Coral Queen*, a shrimp trawler of Fort Myers, Florida, is the first Florida type trawler to have a Caterpillar D342T turbocharged marine diesel engine installed and with several months of good service behind her she has set a record for the new owners for outstanding reliability. Powered by a D342T turbocharged Caterpillar having a cont. horsepower of 200 at 1200 rpm and an intermittent horsepower of 240 at 1300 rpm the engine turns a 52x35 four-blade Columbian bronze propeller through Twin Disc 2.96:1 r&r gears. The Jabsco main bilge pump drives off a Twin Disc power take-off on the main engine. The Lister diesel auxiliary set drives a 2 kw generator and another Jabsco water pump.



Model D342T turbocharged Caterpillar diesel rated 200 hp at 1200 rpm above powers the *Coral Queen*, a 70 ft. shrimp trawler owned by the Kiesel Brothers of Fort Myers.

The *Coral Queen* has a length of 70 ft., a beam of 19 ft. and a depth of 6½ ft. She was designed and built by the General Marine Boat Yard Inc., Fort Myers Beach, Fla., for Hilbert and Charles Kiesel of the Beach Shrimp Co. Construction specifications called for 2 in. cypress planking over oak ribs on the hull and 2 in. cypress planking on the overhead. The keel is of 12 in. by 12 in. heart pine and the oak bow stem is made of 9 by 16 in. timbers. Installation of the 342T Caterpillar

diesel engine was supervised by Shelley Tractor & Equipment Co. of Miami. The new vessel has four fuel tanks with a total capacity of 6000 gal. and two 700 gal. water tanks. It has a gross tonnage of 70 tons with the fish hold capacity 49 tons. Electric control panel is fitted with circuit breakers instead of the usual fuses. Being the first Florida type shrimp trawler with a turbocharged diesel engine installation, it is being watched by all in the shrimp producing industry.

## NEW TUG FOR GULF FLEET

**W**HEN the *Gatco Texas* slid down the ways at Diesel Shipbuilding Co. near Jacksonville, Fla. and joined the fleet of Gulf Atlantic Towing Corp., it was the 19th addition to this fast growing Florida towing concern. Mr. L. M. Winslow, vice president of Gulf Atlantic Towing Corp., said the spanking new craft will operate wherever she is needed which may be anywhere from New York to Texas. Named for the State of Texas, the new towboat has a length of 65 ft., a beam of 17 ft. 3 in. and a draft of 8 ft. 6 in. And like all other vessels designed and built at Diesel Shipbuilding, she is constructed of manually arc-welded steel.

Propulsion is provided by a pair of D375T turbocharged Caterpillar diesel engines developing a cont. horsepower of 325 at 1200 rpm and a max. horsepower of 430 at 1300 rpm with 3.034:1 Twin Disc hydraulic reverse reduction gears. Two 4½ in. steel propeller shafts turn 54x38 four-blade Doran Southerner propellers. Electric power is provided by two D311 Caterpillar diesel, 30 kw 60 cycle 37.5 kva 120/240 volt ac generating sets. To provide sufficient towing range, the *Gatco Texas* has a fuel capacity of 6000 gal. and a fresh water capacity of 1200 gal. All quarters are individually heated by General Electric heating units and are accessible by inside companionways. To

insure safety at sea five watertight bulkheads were constructed into its hull. For navigating the new vessel a Moore electromechanical steering gear plus radar and ship to shore radio and telephone were installed.

The *Gatco Texas* joins the Gatco fleet of about 45 pieces of floating equipment including towboats and barges of various types and sizes which operate regularly between points as far north as New Jersey and south to Brownsville, Texas. The Gulf Atlantic Towing Corp. is the successor to the Gulf Atlantic Transportation Corp. that began operations in Jacksonville in 1942. Its customers

are some of the nations leading chemical and petroleum producers and its equipment has been augmented to this type of service. According to L. M. Winslow, the brawn of the Gatco fleet belongs to the *Gatco Alabama* a 103x25 foot tug powered by a Cleveland Diesel Div. General Motors 12-567C diesel engine rated 1230 hp at 800 rpm which does most of the long and heavy towing for the firm. This vessel, built and delivered to the towing firm last year by the Gulfport Shipbuilding Corp., is working under a steady five year contract towing chlorine and caustic soda barges for Olin Mathieson Chemical Corp. from Alabama coastwise around Key West to Brunswick, Ga.



The twin screw, 650 hp, 65 ft. *Gatco Texas*.





# GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

## Operating Experience With The Gas Turbine Vessel *John Sergeant*\*

\*This is an abstract of paper by R. L. Jackson Gas Turbine Dept., General Electric Co. Schenectady, N. Y., and was presented at the Marine Symposium, ASME Annual Meeting, Dec. 1958

**A**FTER ten round trip passages across the Atlantic this gas turbine ship has the remarkable record of no maintenance expenses on the turbine itself and the over all fuel consumption was .52 lbs. per turbine hp to propeller. The average turbine power is 6000 hp which is conservatively estimated by William Van Cott, the chief engineer of the *John Sergeant* after taking into account trial and calculated data, factoring in ships speed, propeller pitch and rpm. The horsepower rating of the large waste heat boiler is not considered as this is heated by the exhaust gases after they come out of the heat exchanger.

A question was raised at the meeting regarding efficiency, that is in making calculations, should not the boiler be considered. Mr. Jackson emphasized that the ship owner is fundamentally interested in the number of barrels consumed by the ship from port to port including all power plants on board. On future gas turbine ships the fuel consumption can be further improved. Advantages in fuel rate can be had with an inter-cooled gas turbine cycle. This cycle can offer about a 10 per cent improvement in fuel rate over that of the *John Sergeant* with concomitant advantages of less space and weight with no sacrifice in ease of operation and maneuverability. In addition to this the heat exchanger can be increased from 79 to 85 per cent effectiveness. This means the over all consumption would be less than .46 lbs./ship on an average, trip after trip.

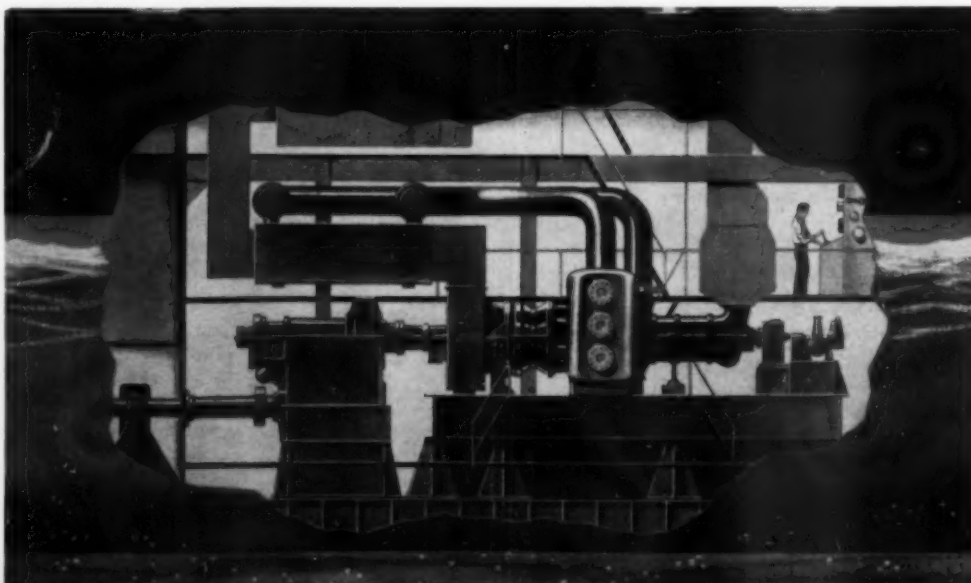
Since the gas turbine was installed, the ship has covered 94,701 miles. In regard to engine operating time, a total of about 7000 hrs. have been logged. Of these 7000 hrs. 4700 have been on residual fuel. The first two and one-half trips were completed on distillate fuel. This was done in order to permit the crew to become thoroughly familiar with the machinery and to shake down the entire propulsion plant before beginning to burn residual fuel. These trips thus accounted for

some 1700 hrs. on distillate fuel. When residual fuel was first burned, the practice of switching to residual fuel after the pilot was dropped after leaving port and back to distillate fuel when the pilot was picked up for entering port was adopted, and thus distillate fuel was burned for maneuvering when entering or leaving port. This practice accounted for another 200 hrs. or so of distillate fuel operation. More recently, however, the ship has operated on residual fuel virtually from dock to dock as the crew has become more familiar with the machinery and has gained confidence in its operation. The remaining 400 hrs. of logged time is factory test stand time. So far, the fuel used by the *Sergeant* has been a Carapito fuel supplied by Esso and available in New York. This happens to be the same fuel used by the SS *United States*. It contains some 58 ppm of vanadium and 15 ppm of sodium in the oil. This fuel is washed and treated on board ship to reduce sodium to less than 2.5 ppm and to inhibit vanadium by adding about 180 ppm of magnesium. The magnesium is added as a water solution of magnesium sulphate or Epsom salts. The amount of Epsom salts used during the 4700 hrs. of residual fuel operation has totaled 34,800 lbs. at a cost of \$.045/lb. With the fuel cost at \$2.90/bbl., the residual fuel treatment has added 1.26 per cent to the fuel price or less than \$.04/bbl. The use of higher vanadium fuels

would require proportionately more magnesium. The over-all operation of the fuel treating system has been good with a total of 42,857 bbl. of fuel having been washed and treated. The fuel is normally washed continuously and then is stored in day tanks which have a two day capacity at 6000 hp. Treatment is added as the fuel is withdrawn from the day tank to the gas turbine fuel pump.

Critics of the gas turbine have frequently pointed to the necessity for the *Sergeant* to burn a special fuel. Actually, that is not the case. The only real requirement is that the fuel, when treated, meets the specification of having low sodium content and a ratio of magnesium to vanadium of at least 3 to 1. So far, no fuel has been found which cannot be washed and treated to specification, but, all fuels of course have not yet been encountered. A number of different fuels have been washed and treated in systems similar to the *Sergeant's*. The *Sergeant* has washed several fuels successfully. During the first voyage, considerable loss in efficiency did occur due to salt contamination of the compressor. The air intakes faced the side of the ship and during dirty weather, a usual winter-time North Atlantic condition, salt spray entered like rain and literally ran on the louvers. Since then, hoods have been fitted over the louvered openings so that air enters only from aft.

6000 hp General Electric gas turbine power plant of the *John Sergeant*.



# NEW BARGE TUG W. D. HADEN II

By DOUGLAS SHEARING

**D**REDGING reef oyster shell is a specialized business and can be a profitable one too—so states Cecil R. Haden, president of the W. D. Haden Co., which has been doing business in the Houston-Galveston trade area for more than 65 years. In 1957 the company dredged and delivered 2,500,000 cu. yds. of this undersea commodity that is used in many concrete mixes because of its great binding properties. This shell was delivered in the trade territory in steel barges

and this type has been used ever since. Today, with its high volume production, the company operates six retail outlets in Houston and single outlets in Galveston, Beaumont, Port Arthur and Dickinson, Tex. Mr. Haden heads the progressive firm with R. T. Dow, vice president; E. E. Lund, secretary-treasurer; J. D. Weber, marine superintendent; W. K. Walters, port engineer; James M. Johnson, assistant port engineer and B. H. Laycock, port captain.

A sister tug to the *Frances Haden*, the *W. D. Haden II* was put in service in March of 1958. Designed by G. O. Weisinger of Parker Bros. Co., the new vessel was built by Bludworth Shipyards, Inc. of Houston. It has a length of 84.1 ft., a beam of 26 ft. and a depth of 9.9 ft. The Superior engines, produced in the Springfield, Ohio plant of White Diesel, are model 40-M5X-8 direct-reversible units with eight cylinders of 8½ in. bore and 10½ in. stroke, rated 650 hp. They are installed as a matched pair and swing 56 in. pitch by 68 in. dia. wheels at 900 rpm. As illustrated, the engine room of the *W. D. Haden II* is spacious and orderly with auxiliary equipment well arranged. Power for ships' service is supplied by two General Motors 4-71 diesels driving 40 kw ac Delco generators.

## List of Principal Equipment

Main Engines	Superior
Governors	Woodward
Auxiliary engines	Detroit Diesel
Auxiliary generators	Delco
Fuel oil filters	Winslow
Lube oil filters	Winslow
Lube oil pumps	Viking
Exhaust mufflers	Burgess-Manning
Lube & fuel oil transfer pumps	Gould
Air compressor	Quincy
Switchboard	Electric Machinery

◀ *W. D. Haden II*, latest addition to the Haden fleet, is powered by twin 650 hp Superior marine diesels.

Winslow lube oil filters in foreground serve the propulsion engines. To left is one of the two GM-Delco generator units. Filters were supplied by Western Sand-Banum Co., Inc. and the engine generator sets by Stewart & Stevenson Services, Inc., both of Houston. ▶



with capacities of from 1000 to 2500 cu. yds. each. These barges are towed by a fleet of eight diesel tugs, the most modern of which is the *W. D. Haden II*, a trim, pusher type tug powered by twin 650 hp Superior marine diesel engines.

The *W. D. Haden* is the second vessel to bear the name of the company's founder. Before the turn of the century, Captain Haden was wheel barrowing reef oyster shell onto the deck of his schooner and taking his product to the market in Galveston. By 1905 the demand for shell for sidewalks and streets had so increased that it became necessary to build mechanical means for dredging shell. As a consequence, the first mechanical dipper-type dredge was built by the Captain in 1905. In 1912 the dipper dredge gave way to a hydraulic dredge







## WHAT'S GOING ON IN ENGLAND

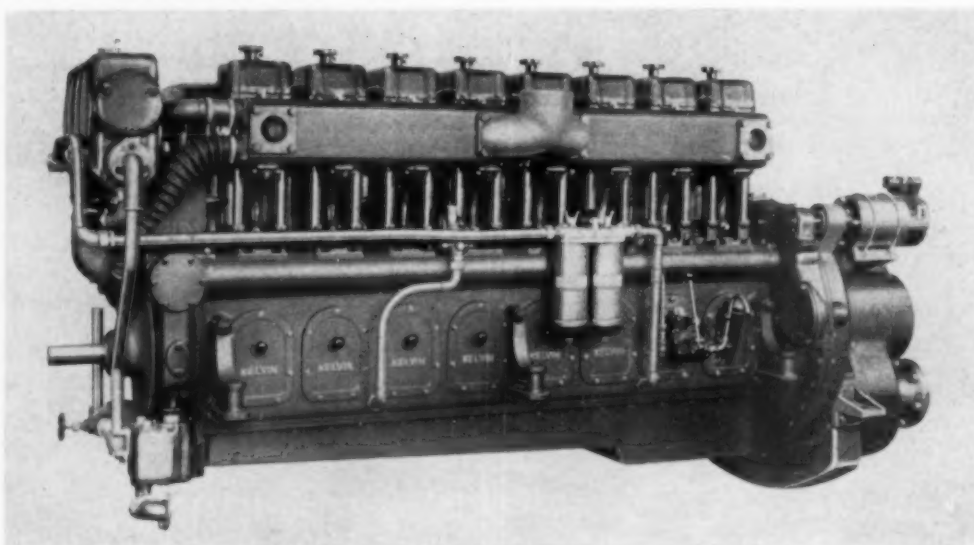
CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

### Kelvin Announces the T Range

**T**HE Bergius Co. in Glasgow, Scotland, have always been closely associated with the development of marine power units designed specifically to meet the needs of fishermen using small and medium size vessels. Their existing Kelvin range of marine engines includes petrol/paraffin models in the  $7\frac{1}{2}$  to 30 hp range and diesel designs from 10 to 132 hp. The new Kelvin design is now announced by Bergius with the introduction of their T series which takes the company into a higher power bracket, specifically up to 240 hp. For the time being, only six and eight cylinder T type engines are in production but additions will subsequently be made as the market demand becomes apparent.

A four stroke cycle is employed and the rated output at 1,000 rpm is 30 hp per cylinder. With the cylinder dimensions of  $6\frac{1}{2}$  in. bore by  $7\frac{1}{4}$  in. stroke the b.m.e.p. is 99 lb. per sq. in. and the piston speed at the rated output is 1200 ft. per minute. The alloy steel crankshaft is underslung in thin-walled copper lead main bearing between each crank; the bearing caps are located in checks machined in diaphragms in the crankcase, each fixed by large diameter high tensile steel studs which extend in length from the main bearing caps to the cylinder heads. The crankcase is of heavily ribbed, high quality cast iron with large inspection doors giving access to all internal parts including the lubricating oil pump. Individual single cylinder heads are used, the cylinders being cast in blocks of two and bolted together side by side to increase rigidity. The inlet manifold carries an air intake silencer and is built up in sections, each of which is bolted to a cylinder head. On the opposite side of the engine is the water-cooled exhaust manifold constructed in two sections and having a central outlet with dry type silencers. The engine is designed with a closed circuit cooling system in which a combined heat exchanger for water and oil cooling is mounted on the front end casing. The fresh water is circulated by a centrifugal pump and the system is thermostatically controlled. The heat exchanger itself is cooled by sea water from a plunger pump, the stroke of which can be adjusted to suit varying sea water temperatures. An identical pump with clutch operation is provided for bilge and wash down purposes. These pumps have inter-



New eight cylinder Kelvin diesel develops 240 hp.

connecting discharge systems so that, in an emergency, the bilge pump can be used for cooling.

Lubrication is from a large capacity pump which delivers oil at 50 lb./sq. in. pressure through full flow filters to the crankshaft, camshaft and rocker spindle bearings. The timing gears and pump driving mechanism are lubricated by splash. A hand pump is fitted for priming the lubricating system and ensuring that all bearings are charged before starting. This pump can also be used for emptying the sump or drawing off an oil sample. A block type fuel pump incorporating a feed pump is employed and twin changeover filters are mounted adjacent to the pump. Injection is direct through four-hole nozzles into the combustion chamber which is a toroidal shaped bowl in the piston crown. A hydraulic governor is mounted on the fuel pump bracket and is driven through a sleeve type flexible coupling from the fuel pump shaft. The engine speed connection is on the governor and the clutch control connection is on the after end of the reverse gear. Remote wheelhouse controls are arranged by rods and levers. An interlock is fitted and it is necessary to lower the engine speed before the clutches can be manipulated.

A 24 volt electric starting system is fitted and one starter motor is sufficient for service in any climate. An alternative starter position is available so that the starter can be mounted on either side of the engine. Decompression levers are provided on top of the rocker cover for use when turning the engine by hand. Power from the engine is transmitted through a hydraulically operated reverse reduction gear which has its own lubrication system and which is fitted with twin hydraulic clutches operating at 50 lb. per sq. in. pressure to provide ahead and astern drive. Spur gearing is used throughout and the reduction ratio, which can be for  $3\frac{1}{3}$  to 1,  $2\frac{1}{2}$  to 1, or 2 to 1 incorporated within the gear train. At the front end of the engine a power take off is provided in the shape of a pulley shaft concentric with the crankshaft and running at the same speed. This can, if required, be replaced by a lever operated winch clutch having extended controls to the wheelhouse. The clutch is capable of easy engagement while the engine is slow running and both pulley shaft and clutch can transmit 80 hp at 1,000 rpm. The eight cylinder T engine measures 10 ft.  $2\frac{1}{2}$  in. in length with a width of 3 ft.  $6\frac{1}{4}$  in. and a height of 4 ft.  $11\frac{1}{2}$  in.



## Air-Maze Appoints Lamprecht



Ned Lamprecht

Appointment of Ned Lamprecht to the post of chief application engineer is announced by The Air-Maze Corp., Cleveland, Ohio. In this new capacity, Lamprecht will be directly responsible for coordinating the company's engineering and sales facilities for applying air and

liquid filters to all types of industrial products. A graduate of Case Institute of Technology, Lamprecht joined Air-Maze in 1946 as development engineer. He was then assigned to sales engineering and later made assistant sales manager. In 1957, Lamprecht became associated with the A. A. Straub Co. of Cleveland as their sales manager and held that position until recently re-joining Air-Maze. Air-Maze manufactures air and liquid filters for use in a wide range of industrial and commercial products, such as engines, electronic devices, ventilating and air-conditioning equipment. Engineering and manufacturing facilities are located at 25000 Miles Road, Cleveland, Ohio.

## New Multi-Purpose Facility

Clayton Manufacturing Company, makers of dynamometers, steam generators, steam cleaners, and portable heaters, has moved its Cincinnati headquarters into a new multi-purpose facility some ten miles northeast of downtown, at 3051 Exon Ave., Evendale, according to Eugene Marks, executive vice president. The new building, just completed, will serve as a training school, a warehouse, a plant for manufacturing Clayton-Kerrick steam cleaning compounds used with its steam



cleaners, and a distribution center for all products. Clayton distributor and customer personnel will be trained at the school which is completely equipped with modern visual aids and the latest Clayton equipment. The warehouse will be one of the company's main supply centers for eastern and midwestern distributors.

## Add Ten New Internationals

Mr. Gus H. Nieman (right), president and general manager of Inland Motor Freight, Seattle, inspects new International model DCO-405 tractors at time of delivery. Nieman recently added ten of the big heavy duty tractors to his line fleet. Delivering trucks to Nieman are (left) A. B. Prindle, International branch manager at Spokane, and M. B. Malmoe, branch salesman. Addition of these ten units brings the number of DCO-405's serving the IMF operation to 42. The new tractors, which will pull 25-ft. doubles, are equipped



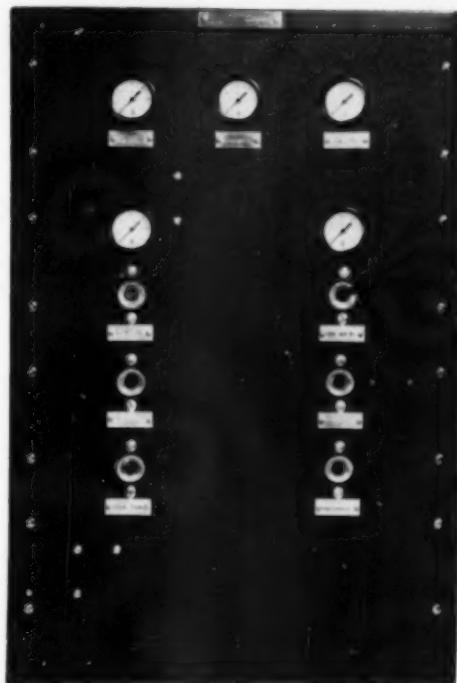
with NH-220 Cummins diesel engines, ten-speed RoadRanger transmissions and double-reduction rear axles. Gross combination weight rating is 68,000 lbs. Nieman's companies serve Washington, Northern Oregon and the panhandle of Idaho.

## Brainard Appointed by Schwitzer

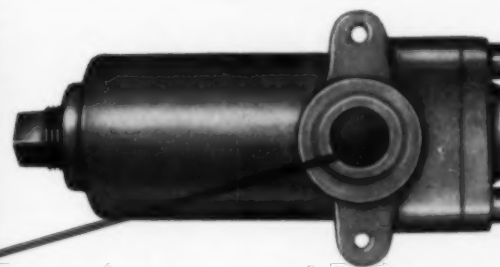
Mr. George C. Brainard, Jr. has been appointed to the position of Assistant to the President of Schwitzer Corporation, effective Nov. 1, 1958. Mr. Louis Schwitzer, Jr., president of the Indianapolis firm, made the announcement.

**HERE IS IMPORTANT INFORMATION!** The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

## WHAT CAUSED THE ENGINE SHUT-DOWN?



AMOT Pressure Operated Fuel Shut-Off Valve



Was it low oil pressure, high water temperature, or what? The new Amot Model 2400 indicating Relay used in combination with the Amot Safety Control System tells you exactly which engine hazard caused the shutdown. Saves everyone the time and trouble of a process of elimination. The Indicating Relays are mechanical, actuated by gas pressure or compressed air—no electrical connections involved. When all safety conditions of the engine are satisfied, the indicating window of each relay shows green. If a dangerous condition arises, the covering safety component vents, causing the corresponding relay window to show red—shutting down the engine. All other windows remain green. Can be installed on existing engines with no changes in starting or operating procedure. For information on components, complete systems including control panel and diagrams, write for Bulletin Q-5.3.

**AMOT CONTROLS CORPORATION**

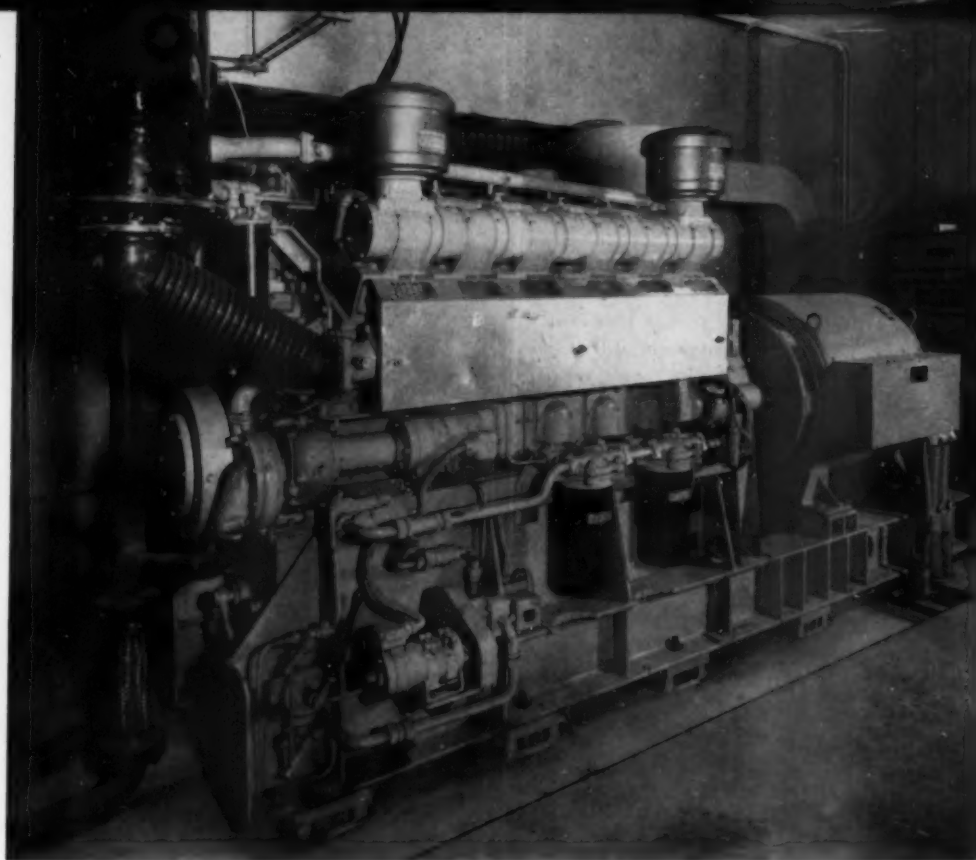
FIRST ST. & NEVIN AVE.  
RICHMOND, CALIFORNIA

By ROBERT J. FRITH

**V**ANCOUVER, the Canadian city at the north end of U.S. Highway 99, now exhibits a new public utility building that is a showpiece. Also, it adds more weight to the thought that even a big-time producer of light, power and gas should own diesels. This public utility company, the B.C. Electric Co. Ltd., with 11 hydro-electric stations and three diesel electric plants can deliver 1,000,000 hp. Its power system is controlled from a load dispatch center on the second floor of the company's new 21-story office building in downtown Vancouver. From here, output of generating plants can be controlled and the transmission lines can be switched in or out of service. This is the company's electrical nerve center. Occasionally storms or other causes result in portions of this electrical network going out of service. The trouble is charted by the load dispatchers and repair crews are sent out from the company's trouble center. Obviously, it is vitally important that power difficulties in downtown Vancouver should not affect the load dispatch itself.

Security against this possibility is provided by a 96 hp Dorman diesel electric power plant in the basement of the B.C. Electric building. In an emergency, this plant would provide power to keep the load dispatch center in operation. Alongside this diesel generating unit a larger 480 hp Ruston-Paxman diesel stands in wait. This larger unit would provide emergency power to keep essential services in operation in the rest of the building. It would provide power for the immense array of billing and accounting machines, one of the several elevators, and emergency lighting. Thus, the B.C. Electric Building and its vital load dispatch center have a two-handed defense against power breaks.

The area served by this public utility includes Vancouver and 1600 square miles of the lower mainland of British Columbia and southern Vancouver Island. This takes in approximately two-thirds of the population of Canada's west coast province. With the diesel standby sets the service in the head office building and load dispatch may flicker for a few seconds if there is an outage, but on such an occasion the two diesels would cut in automatically. Mr. Charles Santwick, diesel engineer and special representative at Walkem Machinery & Equipment Co., Ltd. supplied the Ruston-Paxman diesel. Mr. David Ross, diesel engineer with Galbraith & Sulley Ltd. supplied the Dorman and Melvin A. Thomas was consulting engineer. Both diesels start from batteries. A system of relays acts to close contacts. The two separate diesel sets are in separate rooms. On the 480 hp unit there is a cooling system with the radiator in a separate fan room, 20 ft. away. This isolates heat given off by the cooling system which would have been difficult to dissipate in the main diesel room. The complete units are set on vibration absorbers. Besides an automatic start on power failure, there also is automatic shut down after the main power has been restored for a pre-determined time. This automatic feature is assured for each diesel set by a voltage sensitive relay detector which cuts in if a power line does go out and cuts out, when the power is resumed.



This 12 cylinder Ruston-Paxman diesel standby set, rated 480 hp, is located in the lower level of the company's head office on Nelson at Burrard street in Vancouver. Note dual Air Maze air filters, Kato generator, 375 kva.

## STANDBY PROTECTION FOR UTILITY NERVE CENTER

The new B.C. Electric Co., Ltd. building is constantly lit by night as by day. Two diesel standby sets, one for the main building pictured, the other for the load dispatch through the adjacent sub-station assure continuous power.





## Oil and Gas Power Division Meeting in Houston April 20-23

The 31st Annual Conference and Exhibit of the Oil and Gas Power Division of A. S. M. E. will be held April 20 through 23, 1959, in Houston, Texas at the Shamrock Hilton Hotel. In announcing the meeting, OGP officials pointed to the conference slogan, "OGP Salutes the Historic Southwest—Land of Continuing Frontiers," and predicted one of the finest meeting programs thus far. Space at the Hilton has been arranged for 60 exhibits which will include engines, auxiliary equipment and instrumentation of interest to Pipe Line, Petroleum, Petro-Chemical, Oil, Natural Gas, Earthmoving, Trucking, Stationary Power Plant, Marine and Railroad Industries. Early interest in the conference and exhibit indicates that it will be exceptionally well attended. Companies who are planning to exhibit are urged to contact Exhibit Chairman John E. Onnen at Oil & Gas Power Division headquarters, 122 South Michigan Ave., Chicago 3, Ill. or telephone WEbster 9-2400.

## Fuller Names New Chief Engineer



Charles M. Perkins

Mr. Charles M. Perkins, head of the Research Department at Fuller Manufacturing Co., has been promoted to chief engineer. Mr. Perkins, who joined Fuller in 1948, replaces Thomas Backus, Fuller's engineering vice president from December, 1948, until his retirement

November 15th. Mr. Backus and his wife are moving to Lauderdale-by-the-Sea, Fla. Born in Honolulu, Hawaii, on Dec. 5, 1905, Perkins attended primary and secondary school in England, was graduated from Cambridge University and received his M. S. degree from Massachusetts Institute of Technology. He worked for many years in the gear industry with National Tool Co., Cleveland Hobbing Machine Co., Heald Machine Co. and Palmer-Bee Co. before joining the staff of the Michigan transmission manufacturer.

## Starting Fluid in Aerosol Container

The Sinclair Refining Co., pioneers in the development of diesel starting fluids, announces the introduction of a new aerosol type container for Sinclair starting fluids. This new type container, now available, allows servicing of all types of diesel engines in year-round service. A special gas propellant is used to assure maximum positive discharge pressure at below freezing temperatures. The starting fluid is sprayed into the air filters or intake manifolds and rapid starts are assured at temperatures as low as minus 65° F. Sinclair starting fluid is a select blend of petroleum hydrocarbons and other special compounds. This combination allows trigger-fast ignition and at the same time smoother sustained burning which eliminates the possibility of destructive detonation.

The increasing outdoor year-round utilization of diesel engine equipment, at low temperatures, emphasizes the potential need for a cold weather



starting fluid. Under these circumstances, Sinclair starting fluid sales have increased steadily in recent years to new record highs. The new Aerosol container is an addition to Sinclair's present line of starting fluid containers and applicators. Sinclair starting fluid gives these outstanding properties: provides positive ignition at low combustion chamber temperature; extremely high volatility—high vapor pressure; minus 100°F. freezing point; wide flammability range for easier ignition of lean or rich air/fuel mixtures; high ignition quality—80 cetane number; avoids dangerous peak combustion pressures. For further information on Sinclair starting fluid, contact Technical Service Division, Sinclair Refining Co., 600 Fifth Ave., New York 20, N. Y.

ITS NEW

## The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for Diesel Engines



Depots and  
Service Agents in over  
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4937 West Belmont Avenue, Chicago 41, Illinois  
400 South Edgewood Avenue, Jacksonville, Florida  
Canadian Distributors:  
Joseph Lucas (Canada) Ltd. Head Office: 11 Davies Avenue, Toronto 8, Ontario  
Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec

AP 930



# ASME Gas Turbine Meeting

The turbine in action will be the subject of a three day engineering meeting sponsored by the Gas Turbine Division of The American Society of Mechanical Engineers. Scheduled for Mar. 8-11, 1959, in Cincinnati, Ohio, the conference also features an exhibit of the latest designs and equipment in the turbine field. Five sessions are scheduled over the three days, dealing with marine, aircraft, heat exchanger application and gas turbine component design topics. Among papers that will be presented are those on analysis of the performance of a supersonic exhaust nozzle for turbojet engines, experience with gas turbine ships, development of a three-stage liquid cooled turbine and a boost power turbine for naval propulsion. Besides the technical sessions and the exhibit, attendees will also be offered inspection trips to the General Electric aircraft turbine plant at Evandale and the Cincinnati Milling Machine Co.

The tentative program follows:

## I MARINE PAPERS

J. C. Anderson, Boeing Aircraft Co.—*Description and Service Experience of Various Boeing Gas Turbine Marine Applications.*

R. G. Mills, U.S. Bureau of Ships—*Title to come.*

T. J. Putz, Westinghouse Electric Corp.—*A Boost Power Gas Turbine for Naval Propulsion.*

L. C. Hoffman, Maritime Commission—*Experience on the Gas Turbine Ship "John Sargeant" and the Free Piston Ship "William Patterson".*

J. B. Franklin, Capital Airlines—*Operating Experience with Dart Turbo-Prop Gas Turbines in Airline Service.*

## II AIRCRAFT PAPERS

S. H. Spooner, U.S. Army Transportation Corps—*Analysis of Four Studies of a 250 hp Aircraft Gas Turbine.*

B. Pinkel, Rand Development Corporation—*Analysis of the Performance of a Variable Supersonic Exhaust Nozzle of the Plug Type for Turbojet Engines.*

D. C. Burke, General Electric Co., Aircraft Gas Turbine Division—*Title to come.*

A. A. Hafer, General Electric Co., Aircraft Nuclear Propulsion Division—*Development Work for Aircraft Nuclear Propulsion Plant.*

P. F. Green, Bristol Aero—*Service Experience on Proteus engine.*

## III HEAT EXCHANGER PAPERS

W. M. Kays, Stanford University—*Basic Flow Friction and Heat Transfer Design Data on Regenerator Surfaces.*

P. T. Vickers, General Motors Corp.—*Development of Regenerator Used in GM Vehicle Gas Turbine.*

A. L. London, Stanford University—*Thermal Response of Gas Turbine Regenerators, Intercoolers and Ducting.*

## IV APPLICATION AND DESCRIPTIVE PAPERS

H. Engvall, DeLaval Co.—*Development of Gas Turbine Components for Chemical Process Plant.*

J. O. Stephens, Westinghouse Electric Corp.—*Gas Turbine Operating Experience in the Petro-Chemical Industry.*

A. H. Carameros, El Paso Natural Gas Company—*General Electric Gas Turbine in Pipeline Pumping Service.*

Z. S. Stys, Brown Boveri Corp.—*40,000 Kw Gas Turbine Power Plant, Mayaguez, Puerto Rico.*

## V GAS TURBINE COMPONENT DESIGN & DEVELOPMENT PAPERS

S. M. DeCorso, Westinghouse Electric Corp.—*Effect of Ambient Pressure Condition on Fuel Sprays.*  
Tippet & A. L. London, Stanford University—*Relative Heat Transfer Characteristics of Gases in Nuclear Power Cycles.*

E. M. Knoernschild, Garrett AiResearch Corp.—*The Radial Turbine for Low Specific Speeds and Low Velocity Factors.*

S. D. Hage, Boeing Aircraft Co.—*Development of a Design Method for Axial Flow Turbine, Including Design and Test of a Typical Axial Flow Stage.*

P. M. Klauber, Solar Aircraft Corp.—*Development of a Three-Stage Liquid-Cooled Gas Turbine.*

R. Lang & E. Petrick, Curtiss Wright Corp.—*Application of Electrical Analog Theory to the Solution of Heat Transfer and Aerodynamic Problems Encountered in High Temperature Turbine Design.*

## MEETING SCHEDULE

Sun., Mar. 8th

Setup of exhibits all day and evening.  
Early registration in afternoon.  
Various committee meetings.

Mon., Mar. 9th

Exhibits open 9:00 am. to 6:00 pm.  
Morning Technical Session (9:30 am. to 12 noon).  
Welcoming Luncheon  
Afternoon Technical Session (2:30 pm. to 5:00 pm.).  
Individual Committee Suppers and Meetings (5:30 pm. to 8:00 pm.)  
Evening Technical Session (Opens 8:00 pm.).

Tues., Mar. 10th

Exhibits open 9:00 am. to 6:00 pm.  
Morning Technical Session (9:30 am. to 12 noon).  
Individual Committee Lunches and Meetings.  
Afternoon Technical Session (2:30 pm. to 5:00 pm.).  
Individual Committee Suppers and Meetings (5:30 pm. to 8:00 pm.)  
Evening Technical Session (Opens 8:00 pm.).

Wed., Mar. 11th

Exhibits open 9:00 am. to 3:00 pm.  
Morning Technical Session (9:30 am. to 12 noon).  
Gas Turbine Power Division Luncheon.  
Afternoon—Inspection trip to G.E. Aircraft Turbine plant at Evandale and Cincinnati Milling Machine Co.

## Trawlers For Texas

Three new Florida type 62 ft. shrimp trawlers recently made their maiden fishing trip into the Gulf of Mexico waters side by side. These new trawlers were launched by Diesel Engine Sales of St. Augustine, Fla. for Captain J. S. Santos of the Patterson Shrimp Co., Brownsville, Tex. Capt. Santos is one of the most prominent fishermen in the Gulf of Mexico. Christened the *Pat and Joe*, the *Stephen M* and the *Anita Marie* all were constructed and equipped identically. Measuring 62 ft. in length with a beam of 18 ft. all



three trawlers are constructed of 1½ in. heart select cypress planking on bottom and 1½ in. vertical grain fir on top. The keel is of 9 in. by 12 in. fir with 2¼ by 4½ steam bent oak ribs on 12 in. centers. The deck is of 2 in. by 4 in. long leaf pine and tarred with marine glue. Propulsion is provided by model 6-71 General Motors marine diesel engines equipped with GM 4.5:1 hydraulic reduction and reverse gears which turn 46x36 four blade Federal propellers. The engines are cooled through a Walters Clean-Flo keel cooler. The engine beds are constructed of 10 in. by 10 in. long leaf pine 26 ft. long. Fuel oil capacity is 4000 gals. with 330 gals. of fresh water.

## Inland River Reports

By A. D. Burroughs

J. F. BELLINGER & Son, Jacksonville, Fla., completed the new *Anna Jackman*, missionary boat for the United Presbyterian Church. Two 150 hp engines, donated by Cummins Engine Co., Columbus, Ind., power the craft through Alaskan Island waters.

STEAMER-tug *Alpena* will see new action as a diesel tug in the Merritt-Chapman & Scott Corp. fleet (Cleveland, Ohio). Sturgeon Bay (Wis.) Shipbuilding and Dry Dock Co. handled the conversion, installing Kahlenberg model E-6 turbocharged engines for the rated 750 hp.

THIRD Waxler-name towboat is near completion by Waxler Towing Co., Mumfordsport, Tenn. To be known as the *Billy Waxler*, the triple-screw towboat will be powered with three GM Detroit engines, model 6-71, for a rated 525 hp at 1800 rpm.

TWO 182 hp Caterpillar D-337 engines will power the 50 x 16 ft. twin-screw towboat now under construction at Dubuque Boat and Boiler Co. for Bissell Towing and Transport Corp.

HORN'S Boat Yard, Shreveport, La., is busy completing a 40 x 13 ft. single-screw towboat for stock. Propulsion power will be supplied by a 168 hp GM Detroit engine.

THE *Piasa*, 59 x 21 ft. towboat built by Missouri Valley Steel, Inc., Leavenworth, Kansas, is now on the waterways for owners Norman Brothers, Inc., with 750 hp from a pair of Cummins V-12 engines.

TWO Superior engines from White Diesel Engine Division give the power performance for the new 90 x 26 ft. towboat, *W. D. Haden*. Built by Bludworth Shipyard, Inc., the efficient worker serves owner, W. D. Haden Co., with a rated 1300 hp.

THE *Challenger*, a 50 x 17 ft. vessel with power from twin Cummins Diesels for the 600 hp, is now in service for Williams Towing Co. Morgan City. Built by Solar Shipyard, this unusual boat looks like a tugboat, performs like a towboat.

LOLA H is the name, Caterpillar is the power for the new West Tennessee Limestone Co. boat. Rated at 1000 hp, the craft measures only 66 x 22 ft. in size.

FAIRBANKS-Morse engines supply the rated 1240 hp for the new *Pensacola*.

The 80 x 32 ft. towboat built by Arnold V. Walker Shipyards has been a successful performer for Coyle Lines Inc.

IN St. Louis circles, considerable interest has been created by Dr. H. Hurd's new craft, the 46 ft. pleasure craft, *Steel King*. Built by Grafton Boat Works, (Ill.), the superb craft is equipped with 170 hp GM 4-71 turbocharged engines.

GRAY marine diesel engine, model 6-D427, is scheduled to power the 36 ft. launch now under construction for U. S. Engineers at Grafton Boat Works.

ANOTHER new towboat on inland waters is the *Tom Cook*, a recent production from Humboldt Boat Service, St. Louis. The neat 42 x 14 ft. craft is equipped with a GM 6-110 for the rated 225 hp.

THE *Kathy Lou*, a new 1958 towboat owned by Krotz Springs Lumber Co., (La.), has received its fair share of praises for action on Atchafalaya River. The 54 ft. craft is equipped with two GM diesel engines for the 400 hp, plus Waukesha generating sets.

SPECIAL thanks to a western friend for the Enterprise-powered craft photo. An excellent view of the *Western Star* in action for Western Transportation Company shows service from the 800 hp Enterprise engine, at work on the tough Columbia River.

WAUKESHA performance was adequately indicated in the action of the popular tug, the *Jakie Roberts*. Owned by Salter & Carpenter, in service for Circle Drilling Co., Eunice, La., the tug receives pull-power from twin Waukesha Resolute turbocharged six cyl engines.

### New Generator Literature

Electric Machinery Mfg. Co. announces publication of new, two-page bulletin 2100-PRD-251 which describes a line of high speed, synchronous generators. Available from 50 thru 187 kva, 60 or 50 cycles, the machines are suitable for engine connection (single bearing) or motor driven (two bearing). Photos illustrate construction details. Bulletin is

**HERE IS IMPORTANT INFORMATION!** The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10 1/2" x 13 1/2", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

available, free upon request to Electric Machinery, Minneapolis 13, Minn.

### Waukesha Promotes Gray

Mr. Sam F. Gray has been promoted to the position of chief draftsman of the Engine Division, Waukesha Motor Co., as announced recently by the President of the Company, James E. Delong. Mr.

Gray has been associated with the Waukesha Motor Co. for the past eighteen years and has extensive experience in both design and experimental testing of internal combustion engines. He was graduated from Iowa State University in 1939 with a mechanical engineering degree. He is a member of the Professional Engineers of Wisconsin.

**Young** helps tame the **ATOM...**

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**COOLS NUCLEAR TEST REACTOR**

This Stainless Steel Horizontal Atmospheric Cooler by Young at Knolls Atomic Power Laboratory is specially engineered and fabricated for cooling water used in the nuclear proof test reactor.

**Y**OUNG engineers specially designed this atmospheric cooler to comply with the rigid specifications set by the A.E.C. The first nuclear test reactor duplicating temperature and pressure conditions of a full scale pressurized water power reactor has been placed in operation by General Electric at Knolls Atomic Power Laboratory (KAPL). A stainless steel horizontal atmospheric cooler by Young cools reactor water which reaches temperatures of 550F. and pressures up to 1250 psi.

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## Florida Diesel News

By Ed Dennis

DELIVERED to Importadora Metropolitana C. A. of Caracas, Venezuela, two 40 ft. sportsfisherman craft, powered with a pair of General Motors 4-71 diesels and G. M. hydraulic r&r gears, from the Chris Craft Corp.

CATERPILLAR D397 series D diesel generating set with a 350 kw, 3 phase, 1200 rpm, 60 cycle, 2400 volt generator, mounted on skids, with Modine cooling system; to the Jamaica Tractor & Equipment Co., Kingston, Jamaica, B. W. I.

CUMMINS Diesel Engines of Fla., Coral Gables supplied the N. H. 6. B. I. Cummins diesel rated 200 hp at 2100 rpm for the DC75 Autocar owned by Air Control Products of Miami, and a N. H. 180 Cummins diesel was installed in an International AC220A tractor for the Hunt Tile Co. of Vero Beach.

A 200 hp model 487C-18A, two cycle P&H diesel engine with a Fuller transmission was installed in Mr. Fredrick's Diamond T 830 hiway tractor to haul dry freight from Miami. It has averaged 7 miles to the gal. for the past 50,000 miles.

W. T. HAILEY of Miami is the new Fairbanks-Morse Field Engineer for So. Florida. He is replacing H. H. Bradley who is retiring. Mr. Hailey spent 10 years with Fairbanks, Morse & Co. at the factory and on the road in sales and service. His territory will be from Tampa to Palm Beach and the southern part of the peninsula.

DOWN at Key West, Vans Diesel Sales & Service supplied two General Motors model 4071-C for a crab fishing vessel and F. C. Miller had a pair of 6-71's with 2:1 G. M. hydraulic r&r gears installed in his Palm Beach based, 65 ft., *Tarvas*.

WEST Indian freighter, *Lillian*, an ex LCI craft, had a pair of Caterpillar D375 series D marine diesel engines installed with Snow Nabstedt r&r gears. Also included in the engine room is a pair of 4 cyl Hercules D. O. O. D. 10 kw diesel generating sets. The vessel docks at Auto Marine Engineers, Miami.

TWO model O. M. 312 Mercedes-Benz, 6 cyl diesel engines with 20 kw generators will be installed on the 79 foot *Scotty III* being built at Allied Marine, Miami.

THE 60 ft. *Helen S*, a charter fishing vessel of Pompano Beach, was recently repowered by the J. Frank Knorr Co.

with two type MD47, Penta marine diesel engines that have an output of 82 bhp at 2500 rpm. Also included Capital 3:1 hydraulic r&r gears, Bosch generators and starters and C. A. V. fuel oil injection system.

THE *Southwind II*, a 38 ft. cabin cruiser owned by Sr. Wolf Indorf of Caracas, Venezuela, was repowered from

gasoline to two General Motors 4071-C diesel engines with Paragon 1.5:1 r&r gears by Ellis Diesel Sales & Service of Fort Lauderdale. Two extra fuel oil tanks were installed plus extra tanks on deck for the return trip under its own power, to Venezuela.

NEW addition to the St. Cloud Power Plant was a 1440 hp Superior diesel

generating unit with a 1000 kw Ideal generator, Woodward U. G. 8 governor and Elliott Buchi turbocharger. It was moved from the Tavernier Power Plant — (see Diesel Progress Jan. 1953, Florida Keys Co-op).

CUMMINS Diesel Sales, Inc., Birmingham, Ala. installed the following: a model HR-6-R in a model 27FR Euclid

4 GREAT NEW ENGINES IN THE

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(20 TO 1650 H.P. IN ONLY)

THE GM DIESEL  
ALL-PURPOSE  
POWER LINE  
20 to 1650 H.P.

In only 3 cylinder sizes

NON TURBOCHARGED RATINGS



NEW

"2-53"  
20 to 47 H.P.



NEW

"2-71"  
33 to 67 H.P.



NEW

"3-53"  
38 to 97 H.P.



NEW

"3-71"  
51 to 118 H.P.



NEW

"4-53"  
51 to 130 H.P.



NEW

"4-71"  
69 to 167 H.P.



NEW

"6V-53"  
76 to 195 H.P.



NEW

"6-71"  
112 to 252 H.P.



scraper for the Woodward Iron Co.; a 175 hp HR-6-P to power a water pump for the Rucker Mining Co. and a similar model Cummins in an Orton crane.

FLEET of 18 Oshkosh 24 cu. yd. end dump trucks powered by Cummins model NHRS-6-B, 320 hp diesel engines and model TG602 Allison transmissions will be shipped via West India Lines to

Oriente Province, Cuba to be used by the Moa Bay Mining Company.

THE *Tommy R*, a 38 ft. commercial fishing craft of Miami and owned by Darrett Russel, was repowered with a 4 cyl model X Ford marine diesel engine rated 68 bhp with 2:1 Borg-Warner r&r gears; from Southeast Diesel Marine Inc., Miami.

MODEL 273 Allis-Chalmers diesel having a hp rating of 85 at 2800 rpm, was installed in a Speed Sprayer for the citrus grove spraying by Diesel Equipment Co. of Orlando.

CONSTRUCTION Equipment Co. of Orlando repowered an Allis-Chalmers tractor dozer with a General Motors 6130T diesel and Allison torque con-

verter and Hutchenson Bros. of Fort Lauderdale took delivery of a 795 American dragline with a General Motors 6030-C diesel and G. M. power take-off.

THE 83 foot tug *Hollandale*, powered with a Cooper-Bessemer diesel rated 1050 hp at 400 rpm, was added to the Port Everglades Towing Co.'s fleet. Also in the engine room is a one cyl Witte diesel plus two 15 kw Hercules diesel generator units.

THREE D. W. 15 Caterpillar wheel tractors, powered with 200 max hp Cat diesel engines were delivered by Shelley Tractor & Equipment Co., to Three Bays Development Co. along with three 15 yd. Athey side dump wagons.

PETTER diesel rated 3 bhp drives the 1500 watt Win-power auxiliary generator and Jabsco pump on the *Sky Blue*, a 67 ft. trawler delivered to Versaggi Shrimp Co. of Tampa. A D342 Caterpillar diesel with Snow Nabstedt r&r gears supplies the main propulsion.

WAUKESHA Enginator model N. K. D. B. S. U. rated 390 hp with a 225 kw Electric Machinery generator will be installed in the new terminal building at Miami International Airport. Engineered by Simplex Sales Co., Inc., Miami.

#### MIAMI BOAT SHOW

The Miami International Boat Show will open at the Dinner Key Auditorium on February 20th, 1959. The Show, announced as the South's greatest marine exposition, will run daily from 11:00 am. to 11:00 pm. through February 25th. Over 225 Florida, National and International manufacturers and distributors of boats, marine engines and their accessories will display their 1959 nautical line valued well over the million dollar mark. Inside the huge Dinner Key Auditorium will be a wide range of craft from 75 ft. flying bridge cruisers to tiny dinghies. Outside, some engine and boat manufacturers will have actual water demonstrations on Beautiful Biscayne Bay. Several diesel engine distributors will play a prominent part in the nautical exhibit. General Motors along with Continental and Gray Marine will have their usual fine display. The J. Frank Knorr Co. will feature the Allis-Chalmers line along with the new Swedish Penta diesel. Curtiss-Wright will have their line of Mercedes-Benz marine diesels and Caterpillar will feature their new light weight marine engines. Petter and Onan will be prominently displayed among the small diesel generator units at Miami, America's Winter Yachting Center.

## The Series 53 "Jimmy" Diesel

Smaller and more compact 2-, 3-, 4-, and V-6 cylinder engines based upon the dependable GM Series 71 Diesel

New as tomorrow is the power concept which GM Diesel has embodied in its All-Purpose Power Line.

Using only 3 cylinder sizes, GM Diesel engineers have more than doubled the number of basic engines—vastly increased the horsepower range—yet maintained the famous GM Diesel family relationship and parts interchangeability.

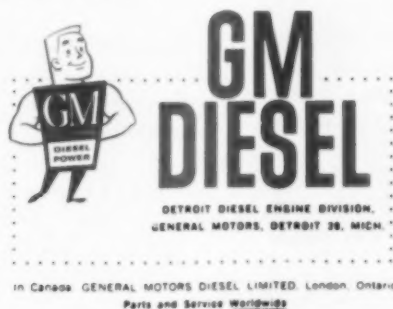
This concept is dramatically illustrated in the Series 53 "Jimmy" Diesel. For *only* in these Diesels are combined *all* the profit-making, cost-saving advantages *any* Diesel has ever had.

Compare them horsepower for horsepower:

They cost less, weigh less, take up less room. Accelerate faster, last longer, and parts cost less. They're easier and less expensive to repair and maintain—far more efficient, too.

All these advantages add up to high earning power and real operating economy. Put a Series 53 "Jimmy" Diesel to work. It will pay for itself amazingly fast when it takes over from a gasoline engine.

This Series 53 "Jimmy" Diesel is *literally* All-Purpose Power in the 20- to 195-H.P. range—marine, industrial, agricultural. Consider it for your needs. Write GM Diesel, Dept. B-2, Detroit 28, Michigan, and see what these new Series 53 "Jimmy" Diesels can mean to your profits—or your pleasure.



NEW  
"2V-71"  
112 to 232 H.P.



NEW  
"3V-71"  
150 to 334 H.P.



"4-110"  
160 to 335 H.P.



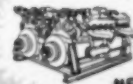
NEW  
"12V-71"  
224 to 304 H.P.



NEW  
"16V-71"  
300 to 675 H.P.



NEW  
"24V-71" (Twin 12)  
448 to 1008 H.P.



NEW  
"32V-71" (Twin 16)  
600 to 1350 H.P.  
(Turbocharged—1650 H.P.)

## West Coast News

By James Joseph

FOR U.S. Public Health Service Native Hospital, Tanana, Alaska, a Caterpillar D342, 100 kw diesel electric set. Sale by N. C. Machinery Co., Seattle.

TO Consolidated Freightways, Portland,

Ore., a Cummins NH-220 engine to power a White freightliner. Sale thru Cummins Diesel Sales of Oregon.

TO Safeway Stores, Inc., Portland . . . five Cummins NH-220s for repowering Peterbilt 351s.

TO the U.S. Army's Beaver Storage Depot, Oregon, a GM 4-71 diesel . . . for

use as a pump engine. Sale by Gundersen Bros. Engineering Corp., Portland.

DELIVERED: Two Cummins NH-220s to Coquille Valley Lumber Co., Swiss-home, Ore., for repowering Autocar DC 10464s.

TUSS Bros. Construction Co., Hillsboro, Ore. has taken delivery of a trailer mounted 300 kw Allis-Chalmers 8DCS-2505 diesel generator set with Schramm air compressor—for shop maintenance.

TO Seattle's Wards Cove Packing Co., a GM-6-110 marine diesel for the cannery tender "Vanguard." The 250 hp engine, with 90 cu. MM injectors, replaces a 135 hp unit.

FOUR Cummins NH-220 engines have gone to Warm Springs Lumber Co., Warm Springs, Ore., for repowering Kenworth CC-923 trucks.

REPOWERING a Mack B-733 LS, is a Cummins NTO-6-B, 262 hp engine purchased by Portland's J.R. Wolkay.

POWERING the tug *Edward A. Young* (Tacoma Tug & Barge Co.) is a Caterpillar D353, rated 290 hp.

INSTALLED on The Foss Launch & Tug Co.'s Barge #208 are three Caterpillar D337 electric sets, powering a 200 hp motor-driven centrifugal air compressor and cement loader. Barge is a cement handler.

TO Sweet Home, Oregon's Gilbert Logging Co., to repower an HC-90 Link Belt, a model 6DA-779 Allis-Chalmers diesel engine with 15 AKFOG Torcon converter for log loading. Sale by Hamilton Engine Sales, Inc.

FOR the City of Portland's Bureau of Water Works . . . a new model FTP60-24 Allis-Chalmers diesel, powering a materials handler with torque converter, power steering, inching controls, and dual pneumatic front tires.

GRANTS Pass, Oregon's Honeyball Trucking Co. has taken delivery on a Cummins NH-220 for powering a White freightliner.

EIGHT Cummins NH-220s have gone to Inland Motor Freight, Spokane, for powering IHCs. Sale by Cummins Diesel Sales, Spokane.

OPERATING on the Korean island of Cheju-Do (between Yellow and East China Sea), seven direct-connected Union diesel electric sets, contracted by the UN's Korean Reconstruction Agency.

AT Bethel, Alaska, N. C. Machinery

Co. has installed a Caterpillar D353 turbocharged electric set augmenting two D326s already supplying the town.

GARRETT Freightlines, Pocatello, Idaho has taken delivery of a model FTD40-24 Allis-Chalmers lift truck, diesel powered with a 4B-153 Allis-Chalmers engine . . . for working the Pocatello warehouse.

TO Eugene's Bissett Crushing Co., a 5 kw trailer-mounted American MARC air cooled diesel, for crushing operation near Sweet Home, Ore.

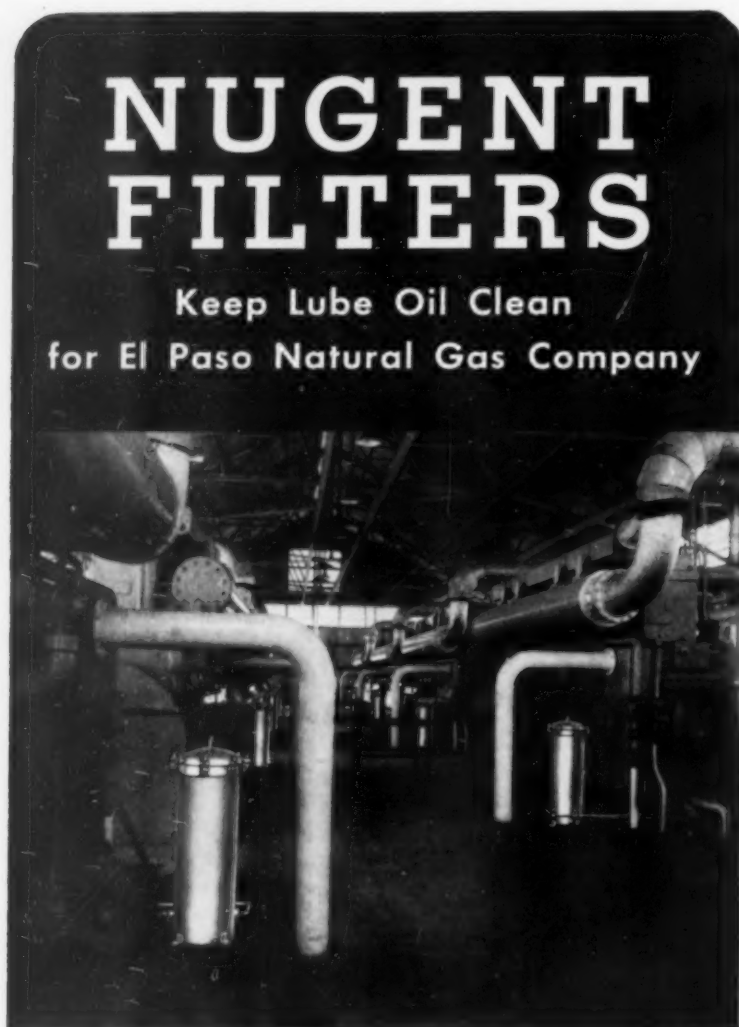
WILLIAMETTE Valley Co., Eugene, has installed a Freightliner WF tractor with a Cummins NHH-6-B.

### New Hercules Distributor

Hercules Motors Corp. has appointed Llewellyn Machinery Co., Miami, Fla., as Hercules distributor for the state of Florida. The Miami company, which operates branches throughout the state, has also acquired the operations of the former Hercules Jacksonville branch. The new distributorship will make its headquarters at 666 Dyal St., Jacksonville. Ralph Denman, former general manager of the Hercules branch since 1956, has been retained as general manager of the new distributorship. Mr. Denman was a sales engineer for Pierce Governor Company, Inc., of Anderson, Ind., for 18 years before joining Hercules. Llewellyn Machinery will handle the entire Hercules line of air-cooled and liquid-cooled diesel, gasoline and LPG (liquefied petroleum gas) engines and power units used in automotive and industrial equipment—engines ranging in capacity from 1 to 600 hp. Distribution will be through all Llewellyn branches throughout the state.

### Dixon Rejoins Cooper-Bessemer

Reassociation of Donald E. Dixon with The Cooper-Bessemer Corp. is announced by Grant C. Woodard, general sales manager. Presently assigned to the company's Turbo-Compressor Group, Dixon will ultimately join one of the regional field offices with responsibility for application and sale of engines, reciprocating and centrifugal compressors, Woodard points out. A graduate of Oklahoma A & M, Dixon became associated with Cooper-Bessemer in 1952 and later promoted to manager, compressor section sales. From this position he was appointed to the C-B Tulsa office where he was directly responsible for field contact work in the greater Oklahoma area. A member of the American Petroleum Institute, Dixon holds the degree of Bachelor of Science, Industrial Engineering and Management.



Twenty-seven gas engine compressor units, each equipped with a Nugent Lube Oil Filter, have been in service at the Goldsmith plant of El Paso Natural Gas Company since 1949.

Excellent bearing, ring and cylinder wear maintenance records are positive proof that Nugent Filters have performed an outstanding job in keeping lube oil clean . . . free from sludge, acidity and harmful impurities that can accelerate wear and shorten engine life.

For safe, effective filtering protection for your valuable equipment . . . always specify Nugent Fuel and Lube Oil Filters . . . available in a wide range of types and sizes. Write for descriptive literature.



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OIL FILTERS • STRAINERS • TELESCOPIC OILERS  
OILING AND FILTERING SYSTEMS • OILING DEVICES  
SIGHT FEED VALVES • FLOW INDICATORS



## Mid-West Diesel News

By L. H. Houck

ALEX GATES, owner of the Jefferson City Diesel Sales & Service, announces opening of his new location with greatly expanded facilities. He is dealer for LeTourneau-Westinghouse, J. I. Case.

LYMAN Richey Sand & Gravel Co., Omaha, a 180 hp NH-180 Cummins diesel for powering a Hetherington & Berner outfit, from Cummins Mid-West Co. Inc., Omaha.

ST. CROIX County Highway Dept., Hammond, Wis., a Cummins H-6-IP for repowering a No. 610 Adams grader, from Cummins Diesel Sales, Inc., St. Paul, Minn.

D. & L. Transport, Cicero, Ill., has repowered an Autocar DC106TN-151 with a 190 hp HRF-6-B Cummins from Cummins Illinois Engine Sales, Inc., Chicago.

ASSOCIATED Transport has added 12 Mack H67T COE's with sleeper cabs, Mack Thermodyne diesel engines, Mack transmissions, to its large fleet of over-the-road tractors.

WALTER Knoblock, New Carlisle, Ind., a 190 hp HRF-6-B Cummins for repowering a Diamond T 921 CR, from Cummins Diesel of Indianapolis.

GRANT Bowles, Keokuk, Ia., an International TD-18 tractor with dozer from Mo.-Ill. Tractor Co., St. Louis.

GEORGE Dawson, Washington, Mo., contractor, a TD-20 International with dozer from Mo.-Ill. Tractor Co., St. Louis.

JANUARY 4 of this new year marked the end of electric trolley busses in Kansas City, when the Kansas City Public Service Co., finished removal of 80 electrics with trolley wires and underground cables. They were called trackless trolleys and placed in service in 1938. They have been replaced with 67 new GMC diesel powered busses costing about \$1,680,000.

L. C. POPE, Grinnell, Iowa, has installed a 220 hp NH-220 Cummins in an IHC tractor. Unit was sold by Cummins Mid-West, Omaha.

DRILLERS Engine & Supply, Inc., Oklahoma City and J. B. Cook Auto Machine Co., Nashville, have been appointed Hercules distributors and will handle Hercules diesels and LP gas engines up to 600 hp.

FISCHER & Fichtel Grading Co., St.

Louis, recently placed a TD-20 International tractor with dozer in service. Sale was by Mo.-Ill. Tractor Co., St. Louis.

AN HRS Cummins to Gibbar Bros. Co., Perryville, Mo., for powering a Cedar Rapids rock crusher, from Cummins Mo. Diesel Sales Corp., St. Louis.

ONE of the first diesel-electric locomotives used in railroad service in the U. S., Baltimore & Ohio No. 50, has been presented to the National Museum of Transport at St. Louis. It is a joint gift from the Electro-Motive Div., GM, Car and Equipment Dept., GE and Hyman-Michaels Co. It was built in 1935 and has an 1800 hp GM 2-cycle diesel power plant.

THREE NH-220 Cummins diesels to San Juan Lumber Co., Pagosa Springs, Colo., for repowering Mack B 73-S trucks used in logging operations. Delivery was by Cummins Diesel Sales Corp., Denver.

ZANETTI Bus Line, Rock Springs, Wyo., a 130 hp JN-6-B Cummins for repowering a Flexible bus from Cummins Intermountain Diesel Sales Co., Salt Lake City.

TWELVE Mack B61T diesel trucks to Minute Maid Corp., Plymouth, Fla., for use in hauling citrus products to the north, midwest and western markets.

J. T. MALONE Construction Co., Webster Groves, Mo., an International TD-24 from Mo.-Ill. Tractor Co., St. Louis.

A. H. SEEBOLD Rental & Excavating Co., Granite City, Ill., an International TD-9 with Drott loader from Mo.-Ill. Tractor Co., St. Louis.

TRANSPORT Motor Express, Ft. Wayne, Ind., a Cummins NH-180 to repower a Hendrickson BD-270-B, from Cummins Diesel of Indiana, Inc., Indianapolis.

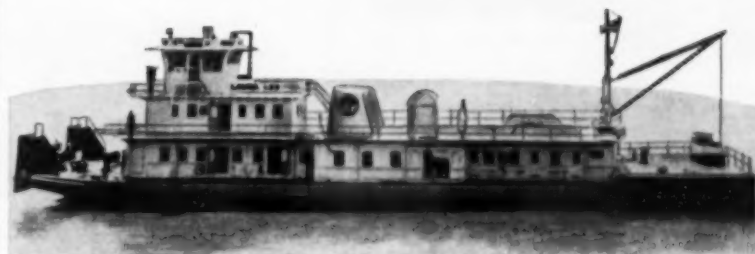
### New Appointments at Link-Belt

Link-Belt Co. has announced new positions for T. W. Matchett, John D. Riley, Harry G. Andersen and Harry M. Horton. Mr. Matchett has been appointed assistant general manager of Link-Belt's Caldwell plant in Chicago. He joined Link-Belt in 1946 and has been manager of the Chicago district office since 1948. He received his engineering degree from Lehigh University. Mr. John D. Riley succeeds Matchett as district manager at Chicago. For the past four years he has been district manager at Cleveland and before that was district manager at Newark, N. J. He joined Link-Belt in 1934 at the Philadelphia

plant and has also served at the Boston office. He attended the University of Pennsylvania. Mr. Harry G. Andersen has been appointed district manager at Cleveland, succeeding Riley. He was formerly district manager at Summit, N. J. Mr. Andersen joined Link-Belt in 1937 at the Chicago Pershing Road plant and subsequently served as sales engineer at Chicago and Milwaukee dis-

trict sales offices and as district manager at Birmingham. He attended Northwestern University, Illinois Institute of Technology and University of Wisconsin. Mr. Harry M. Horton succeeds Mr. Andersen as district manager at Summit, N. J. He was formerly a district sales engineer at that office. He has been with Link-Belt since 1948 and is a graduate of Yale University.

## COMPACT O-P POWER MAKES *Laura Lee* RECORD PERFORMER ON MISSISSIPPI!



After 16 months of operation, Upper Mississippi Towing Corp., Minneapolis, reports:

"The *Laura Lee*—our third O-P powered towboat handling 21 barges north and 28 south on the Lower Mississippi from New Orleans to Cairo—further justifies our faith in Fairbanks-Morse Opposed-Piston Diesel Engines!"

*Laura Lee's* record-making combination of power, speed and maneuverability was no surprise to her owners, or to the St. Louis Shipbuilding and Steel Co., designer and builder. Powered by three Fairbanks-Morse O-P Diesels, each developing 1600 hp. at 720 rpm., this superb pusher-towboat can handle mixed tonnage tows of 20 to 30 barges anywhere on the Mississippi River System!

The high performance, proved economy and low maintenance of F-M marine O-P power can be your solution to rising labor and operating costs and increasing competition. Whether you're building or repowering, see your nearby F-M Marine Specialist. O-P Diesels range from 300 to 2880 hp. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.



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DIESEL, DUAL FUEL AND GASOLINE ENGINES • ELECTRICAL MACHINERY  
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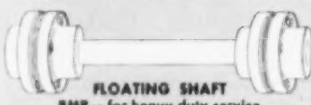
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Thomas' 40 years of flexible coupling experience is at your disposal to help you meet ordinary applications or special variations for unusual cases.



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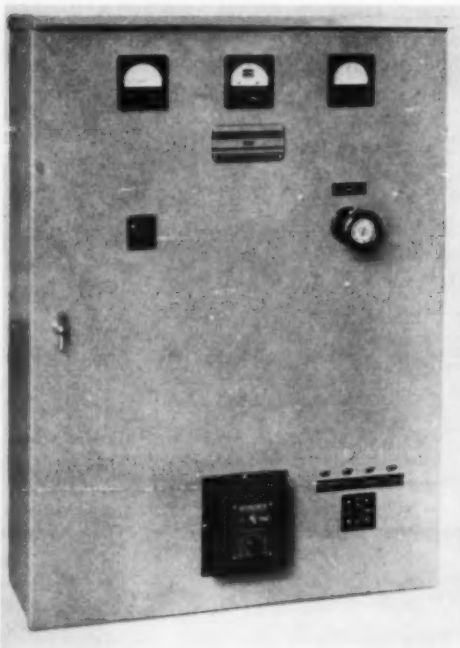
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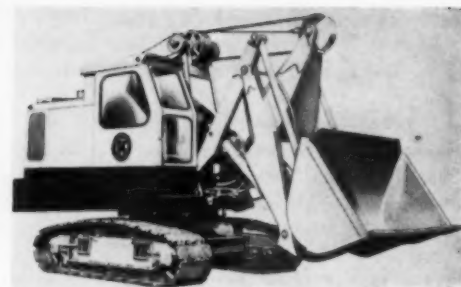
WARREN, PENNSYLVANIA, U. S. A.

## New Unified Control Center

A complete diesel generator control center incorporating generator switchgear, Trans-O-Matic automatic transfer switch, engine start control, and battery charger has been integrated into a single cabinet that can be engine or wall-mounted. Developed by the Lake Shore Electric Corporation, the control is available in capacities to 800 amps., 600 volts with interrupting capacities to 50,000 amps., rms. The novel design innovation that permits shrinking about 16 sq. ft. of individual controls into the 51 in. x 34 in. x 11 in. NEMA type 1 enclosure is obtained by adapting for overload protection in the switchgear circuit the emergency-side molded case circuit breaker used in the Trans-O-Matic switch. As a result, two breakers are made to do the work of three used in separate controls. In addition to the four major controls, the company also offers choice of five makes of voltage regulators, including its recently-announced Auto-static regulator. The latter is of a printed circuit design employing transistors for voltage sensing and control. The Trans-O-Matic switch is of a dual, molded-case circuit breaker design employing a mechanical, motor-operated linkage. Only two positions are possible: normal open—emergency closed; normal closed—emergency open. Also provided in the Trans-O-Matic circuit is the new Lake Shore Electric adjustable differential voltage relay. The unit employs two potentiometers which permit adjustment of pick-up and drop-out from 70 to 90 per cent of normal. It is designed in both single and three-phase models. The engine start



control is available with optional single-crank or with a 5-shot interrupted-cycle programmed with four equally-spaced rest periods. The unit also contains standard relays for shutdown and alarm for low oil pressure, water temperature, over-crank, and over-speed. A manual "Off-On" switch with test position also is provided. Each integrated control carries the standard Lake Shore Electric warranty which applies to the individual control units separately, the manufacturer states. Further information may be obtained from The Lake Shore Electric Corp., 205 Willis St., Bedford, Ohio.



## Koehring 'Skooper' Introduced

The Skooper, offering a revolutionary concept in speed loading, has been introduced by Koehring. By utilizing the fast swing of an excavator turntable and a 7 ft. independent crowding action, the Skooper can go through numerous complete loading cycles while standing in one place. Job condition tests have shown that the unit can load 400 tph. Operated with 70 hp furnished by either a General Motors 3-71 or Caterpillar D-315 engine, this amounts to 5.7 tons for each horsepower hour, an important economy feature in loading operations. The virtual elimination of track movement, plus smooth swing and crowd action, cuts operator fatigue to a minimum, allows continuous full production. Transmission and track maintenance and wear are negligible. Available with buckets ranging from 1 1/8 to 2 1/2 cu. yds., the Skooper has a cutting height of 17 ft.-4 3/8 in. A 9 ft.-8 in. maximum clearance at end of the dump is well within the height necessary for loading over side or end of trucks. It is also high enough to load railcars and to charge portable batching units currently being introduced. The Skooper bucket cuts evenly up any angle of sloping bank, as well as on an accurate level grade. Crawlers can head into the digging or be set parallel to the bank, making full use of the turntable action. Recommended job applications by the manufacturer include material rehandling, quarry and underground work, basement digging, coal and slag loading and removal of pavement in highway and street repair. The sure-footed track means full digging power and accessibility on highway construction projects. Complete information on the Skooper is available from Koehring Division, Milwaukee 16, Wis., or distributors. Sales in Canada will be handled through Koehring-Waterous Ltd., Brantford, Ont., and its affiliated distributors.

## American Bosch Appoints McCormick



Barry J. McCormick

Mr. Barry J. McCormick has been appointed manager of the Detroit regional sales office of American Bosch Division, American Bosch Arma Corp., according to an announcement by Bert Cole, general sales manager of the division. Mr. McCormick has been associated with American

Bosch since 1940. At first he was connected with the production planning department and later became assistant production manager. In 1950 he was transferred to the sales department and assigned as a field engineer to the Detroit Office, where he has been assistant manager since 1956.



**THIS MUCH DIRT CAN RUIN A DIESEL ENGINE**



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**STOPPED THIS MUCH DIRT**

Diesels can't escape abrasive dirt . . . and it takes about 8 ounces of it to ruin an engine.

The 18 pounds of dirt shown above were stopped by a Purolator heavy duty dry type air filter on a rock drilling rig in 940 hours of operation—with no servicing of the filter required. The 6 cylinder, 2 cycle engine and the 750 CFM compressor used on the job were fully

protected through the toughest operating conditions. 18 pounds of dirt were stopped . . . none got through the filter.

There's a Purolator dry type air filter designed to meet the specific requirements of your operation. Write today for full information. If you have a particularly tough problem, describe it . . . Purolator has the solution.

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## Michigan-Ohio News

By Jim Brown

APPOINTMENT of Gene McNulty as manager of Cummins Diesel Sales Corp., Iron Mountain, Mich. has been announced by C. R. Boll, vice president of sales, Cummins Engine Co., Columbus, Ind. Formerly a branch of the Hibbing,

Minn., distributorship, the Iron Mountain distributorship was established as a direct sales and service outlet of the Cummins Diesel Sales Corp. Nov. 1.

PETTIBONE model 250 (3¼ yd.) loader with a GM model 4-71 Detroit diesel engine and equipped with a special hook for lifting forms and bins on paving operations and push-plate for push-

ing scrapers was recently delivered to Bairley and Lindley Const. Co. The new Pettibone was sold by Cyril J. Burke, Inc. and will be broken in on a State Highway project on US-24.

JOHN Walser of Pontiac, Mich. has accepted delivery on a new Super "99" Austin-Western scraper equipped with a GM model 4-71 Detroit diesel engine.

Sale was made by the R. G. Moeller Co. of Detroit.

ONE of the new TD-15 International tractors has been delivered to Rollo Van Gieson of Jackson, Mich. Equipped with a hydraulic bulldozer blade and powered by the new IH 6 cylinder 105 hp model D-554 diesel engine, the unit was sold by the Grand Rapids branch of Wolverine Tractor and Equipment Co.

JACK Anglin of Novi, Mich. has accepted delivery on two Allis-Chalmers model TS-160 motor scrapers. The scrapers were sold by Earle Equipment Co. of Detroit and are being broken in at a peat field near Novi.

G. L. SITTSE has been unanimously elected by the Board of Directors of Bay City Shovels, Inc., as executive vice-president of that firm. Mr. Sittser brings to his new post a wealth of experience in both the automotive and industrial fields, having been associated in an executive capacity with nationally known manufacturers.

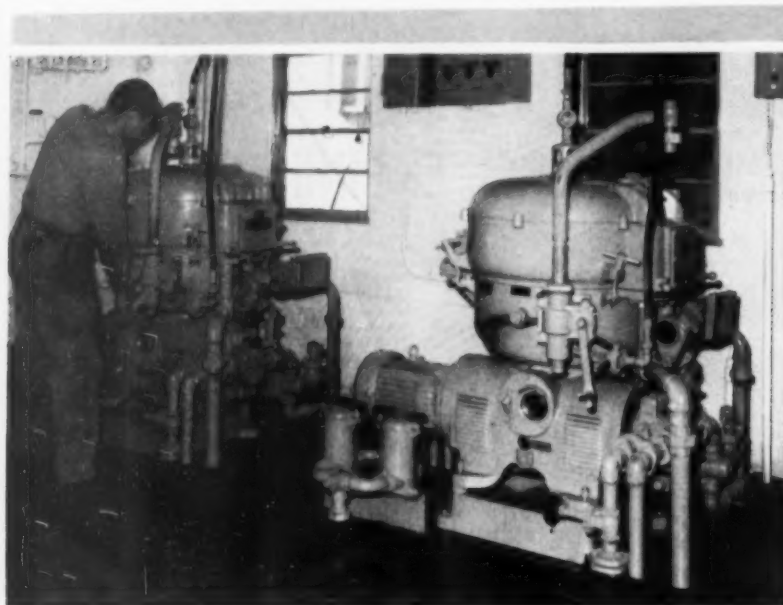
WITH the introduction of a 13 ton Michigan model 110 Tractor Wagon, the Michigan line of construction equipment now extends to rear dumps—according to an announcement by Clarence E. Killebrew, vice president, Clark Equipment Co., and general manager of the Construction Machinery Division.

H. & H. CONSTRUCTION Co. located at Dundee, Mich. has accepted delivery on an Ingersoll-Rand Drill Master equipped with a IR 600 cf air compressor and GM model 6-71 Detroit diesel engine. Sale was made by Cyril J. Burke, Inc. of Detroit.

P. W. POLING of Lancaster, Ohio has a new Cummins 175 hp model JT-6-B engine in his Reo model TD 23 truck. The engine supplier is Cummins Diesel Central Ohio, Inc. of Columbus, Ohio.

IVAN Schworm of Traverse City, Mich. has accepted delivery of a Hough model HOD Payloader equipped with a Hercules diesel engine. The new Hough was sold by the Grand Rapids branch of Wolverine Tractor and Equipment Co. and will be broken in on a road construction project.

EARLE Equipment Co. of Detroit recently sold one of their tractors of the Chevrolet Motor Div. at the new aluminum foundry in Massena, N.Y. The tractor was a model HD6G Allis-Chalmers equipped with a TS-6 tractor shovel and Tulsa T35S winch. The tractor will be used for moving machinery in and around the factory and for snow removal and other miscellaneous jobs.



On board the new super towboat *United States*, two WESTFALIA SAOG-4016 De-Sludgers purify residual oil to power four 2125-hp diesel engines. Either De-Slugger has ample capacity to supply all four engines at top speed. Thus, the *United States* runs economically on residual oil at about half the cost of distillate diesel fuel.

## NOW: Widest Range of Automatic Residual Fuel Purifiers Offered in WESTFALIA's Expanded Automatic De-Slugger Line

### New SAOG-5016 De-Slugger Highest Capacity Automatic Oil Purifier

Use of low cost residual oils as fuel for diesel engines is growing by leaps and bounds. This trend has been accelerated by the development of automatic oil purifiers. WESTFALIA Automatic De-Sludgers are outstanding for their high efficiency, sturdy construction, economy of operation and ease of handling. With the addition of two new De-Slugger models, SAOG-5016 and SAOG-3016, the WESTFALIA Automatic De-Slugger line now offers the highest capacities available anywhere, as well as the widest range of capacities for both two-step and single-step operation.

Avoid costly "guess work" by selecting the proper WESTFALIA Automatic De-Slugger to suit your specific requirements. We are ready to help you plan your diesel fuel purifying operation. Write for details today.

EFFECTIVE CAPACITIES OF WESTFALIA AUTOMATIC DE-SLUDGERS (gph at various viscosities)				
Viscosity, SSU (100°F)	Model SAOG- 2016	Model SAOG- 3016	Model SAOG- 4016	Model SAOG- 5016
<b>Two-Step Operation*</b>				
500	600	750	1000	1250
1700	475	575	775	1000
3300	400	500	650	850
5000	300	375	500	650
8000	250	300	375	500
<b>One-Step Operation</b>				
500	400	500	650	850
1700	300	375	500	650
3300	250	325	425	550
5000	200	250	325	425
8000	150	200	250	325
Clarifier Size for 2nd Step in 2-Step Operation	OG- 2016	OG- 4016	OG- 4016	OG- 8016

\*First step: Purification by De-Slugger; second step: clarification by standard separator.

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MARION Power Shovel Co. has announced the addition of a new 45 ton wagon crane, designated the type 362, to its line of excavating machinery. The off-highway unit was designed primarily as a rehandling machine and for drop ball applications in quarries. It can carry up to 150 ft. of boom and 15 or 20 ft. jibs. It features Marion air controls. Power is furnished by either a GM 6-71 diesel with electric starter and straight drive standard, or a Cat D326F with gasoline engine starter with speed reducer drive standard. Torque converters are optional.

L. W. EDISON Co. of Grand Rapids, Mich. has accepted delivery on an Allis-Chalmers model HD21A diesel tractor equipped with a cable controlled blade and an AC 225 hp engine. The sale was made by Earle Equipment Company of Detroit.

A PETTIBONE-Mulliken model 125 (1½ yd.) loader was recently sold to John Monte Co. Inc. of Detroit by Cyril J. Burke. The new loader is powered by a Hercules model, DD339 diesel engine and will be broken in on a large sewer job in West Chester, Pa.

SARGENT Construction Co. of Saginaw, Mich. has accepted delivery on a model HOD Hough Payloader. The new Hough is powered by a Cummins diesel engine and was sold by Wolverine Tractor & Equipment Co.

AN ALLIS-Chalmers model HD11E crawler tractor equipped with hydraulic bulldozer was recently sold to Giannetti Bros. Co. of Detroit by Earle Equipment Co. of Detroit.

CONSTRUCTION Equipment Co., Detroit, has been appointed as distributor for the industrial "crab tractor" manufactured by Napco Industries, Inc., Minneapolis, Minn.

WITH the introduction of a 13 ton "Michigan" model 110 tractor wagon, the "Michigan" line of construction equipment now extends to rear dumps, according to Clarence E. Killebrew, vice president, Clark Equipment Co. and general manager of the Construction Machinery Div. The tractor wagon is designed to haul rock and similar material that can't be self-loaded by scraper. Its low loading height (7½ ft.) permits it to be fed by virtually any power shovel, conveyor or medium-duty tractor shovel. It has heaped capacity of 12 cu. yds. and 8.3 cu. yds. struck. It can haul a 13 ton load.

W. J. SPIROPOULOS, Toledo, Ohio has a new Cummins model NH-180 in his Brockway model 240 XW truck. The

engine supplier is Cummins Diesel Michigan, Inc. of Dearborn, Mich.

ARGERSINGER & Morse of Ann Arbor, Mich. has accepted delivery on a Lorain model L56K7 combination crane and dragline powered by a GM 4-71 Detroit diesel engine and equipped with torque converter. The new Lorain was delivered to Jackson, Michigan where

Argersinger & Morse are working on a State Highway bridge job just south of Jackson at US 127. The sale was made by R. G. Moeller Co. of Detroit.

NORTHWEST model 25 pull-shovel with a ¾ yd. bucket and powered by a Murphy model 11 diesel engine was recently sold to Canzano Excavating Company of Detroit. The Northwest

will be used for general excavation work and was purchased from Cyril J. Burke, Inc. of Detroit.

OLIVER OC46 ¾ yd loader equipped with a Hercules diesel engine was delivered to Earl Dault of Alpena, Michigan. The sale was made by Cyril J. Burke, Inc. of Detroit, Hercules distributors for the state of Michigan.

## New 100-ft. General Motors Tug for Moran Towing & Transportation Co., Inc.



Designed By Marine Design Section, Cleveland Diesel Engine Division of General Motors. Built by Jakobson's Shipyard, Oyster Bay, L. I.

"We chose General Motors power for the NANCY MORAN, our 58th tug, because it has proved itself the best kind of propulsion you can buy," says Admiral Edmond J. Moran, President, Moran Towing & Transportation Co., Inc.

"In a fleet this size we can't afford to make mistakes," says Admiral Moran. "Our customers know they can count on our General Motors Diesel-powered tugs for

peak performance and reliability. And we know they're tops in economy."

The new NANCY MORAN is powered by a 1600-horsepower General Motors 567C Diesel engine driving a five-bladed propeller through a Wichita clutch.

Wherever towing service requires dependable, efficient power, Cleveland Diesel engines are first choice today.

A GOOD PRODUCT PLUS GOOD SERVICE GIVES TOP PERFORMANCE

# CLEVELAND DIESEL

Engine Division of General Motors • Cleveland 11, Ohio

#### SALES AND SERVICE OFFICES:

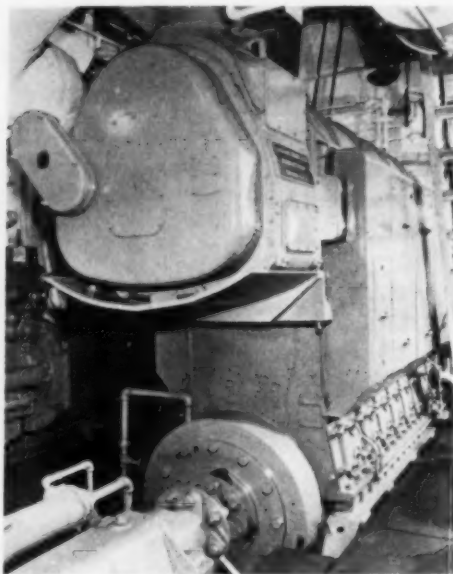
Chicago, Ill.	New York, N. Y.	Portland, Ore.	San Diego, Calif.	Seattle, Wash.
New Orleans, La.	Pittsburgh, Pa.	St. Louis, Mo.	San Francisco, Calif.	Wilmington, Calif.

## Tuna Clipper *Lois Seaver*



The sleek-lined tuna clipper *Lois Seaver* is the 12th of the 340 ton class fishing vessels designed and built by National Steel and Shipbuilding Corp. of San Diego, California, and the tenth to be powered by a Fairbanks, Morse & Co. opposed-piston diesel engine. The main engine, a 6 cylinder model 38D8 $\frac{1}{2}$  direct-reversing opposed-piston diesel rated at 960 hp at 720 rpm, drives the five-bladed propeller 240 rpm through a 3:1 Western Sea Master reduction gear. Other equipment supplied with the engine includes a Thomas fly-wheel-type flex coupling, Ross heat exchanger and lube oil cooler, marine-type Woodward governor, Alnor exhaust pyrometer, Kittell exhaust silencers, Burgess air filters and Air Maze lube oil strainers. Pumps play a major role on a modern clipper and there are 22 F-M pumps aboard the *Lois Seaver*. Applications include brine water and bait water circulation, lube and fuel oil transfer, fresh water

and salt water pressure, bilge, ballast and fire pumping. In addition to powering all of the pumps, F-M induction motors are used for driving the steering, deck winch, anchor, cargo winch, and the refrigeration compressors. Motors in these applications range from 5 to 30 hp.



960 hp Fairbanks-Morse direct-reversing marine diesel engine provides propulsion power for the *Lois Seaver*. New tuna clipper, 318th hull built National Steel and Shipbuilding Corp., prior to launching.

## Diamond T Diesels on AASHO Road Test

These eight heavy-duty Diamond T diesels recently left the Chicago manufacturer's plant headed for the AASHO Road Test at Ottawa, Ill. They are the major portion of units assigned to the two heaviest GCW classifications—those grossing 88,000 and 107,000 lbs. Together with other trucks of various sizes, these Diamond T's will operate in extensive tests to determine how pavement of varying thicknesses withstand axle loads ranging from 2000 to 48,000 lbs. Tests are sponsored by the American Association of State Highway Officials, and are expected to take the guess work out of future highway building. Highway engineers, vehicle manufacturers and operators and legislative bodies have expressed keen interest in the project. The research program is expected to cost some \$22,000,000. Traffic will run in ten lanes on five test loops. It is anticipated that the trucks will be in operation at least 18 hours a day, six days a week, over a two year period. Specially designed instruments will measure and record the effects the traffic has on the pavements. The various loops will have some 836 separate and distinct test sections with nearly 200 different combinations of construction—varying thicknesses of surfacing and sub-base. Diamond T diesels built for the 88,000 lb. Gross Combination Weight group are model 921R-SQDD, powered by the 190 hp Cummins HRF-6 diesel engine. Also in the specifications of these tandems are Fuller R960 Road-Ranger transmissions, Timken FE900 front axles, Timken SQDD tandem rear axles and Spicer 14

# FREE



## SILENCER CATALOG

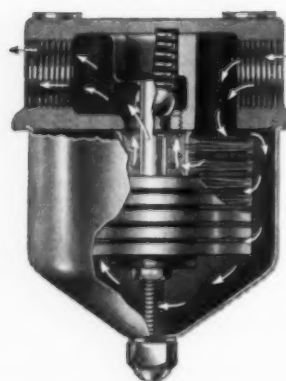
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form of multiple discs which afford over six times more effective area than the same size cylinders. Built-in relief valve optional. Sizes from 1.7 to 720 gpm. Write for bulletin LFC-556. **AIR-MAZE CORPORATION**, Cleveland 28, Ohio.



in. two-plate clutches. Heaviest group, where the GCW is 107,000 lbs., finds the Diamond T model 921NT-42M-OH—a model which is widely used for all types of off-highway construction work, such as dump and mixer service. Their Cummins NTO-6 diesel engines are turbo-supercharged and develop 262 hp. Once again, power is transmitted

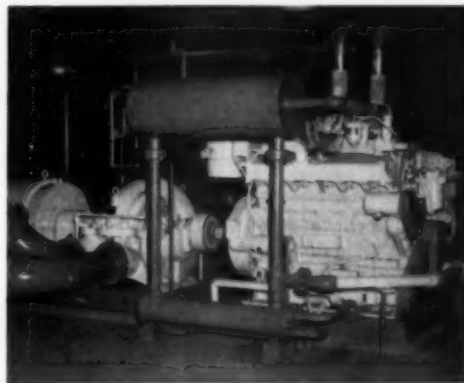


through the heavy-duty Fuller R960 RoadRanger transmissions; this transmission is of single-stick design and is unusually easy for the driver to handle, as well as providing precisely the correct reductions for such an operation. Also included in the specifications of these extra-heavy-duty units are the following components: Timken 27465 front axle rated at 13,000 lbs., Eaton-Hendrickson 42M tandem rear axle with Hendrickson model 600 suspension, and Spicer 14 in. two-plate clutch.

#### Diesels Assure City Water

Water—a precious commodity in the Los Angeles basin—is assured residents in case of electrical power failures by the presence of two Cummins

Turbodiesel emergency stand-by units. The Cummins pumping installation photographed was recently put into service at the Coldwater Canyon Pumping station. A similar unit has been in operation for some time at the Beverly Glen pumping plant. The model VT-12-I engines were provided by Cummins Service & Sales, Los Angeles, Calif. The engine is governed for 400 hp at 1775 rpm. It drives a DeLaval 2 KS 10/8 two-stage horizontal pump through a Rawson centrifugal clutch. The pump's capacity is 2400 gpm at 200 lbs. pressure. The engine is cooled by a Ross heat exchanger, shown in the foreground. It is equipped with two Kittell residential silencers, two Perry water conditioners, a Worthington raw water pump, two Vortex air cleaners and a dual Nugent full-flow lube oil filter. The automatic controls were made by the electrical department of the Los Angeles Department of Water and Power.



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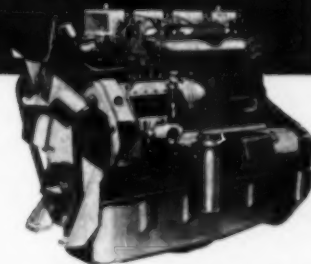
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This means you can have your equipment shipped anywhere in the world—without motors—at less cost to you and your distributor. Your customer can then readily install a Perkins diesel package, tailored to your application and approved by your engineering department, at destination point. This would also reduce the dollar cost of the equipment, important to customers in the non dollar area.

Perkins maintain an engineering staff in Toronto, Canada. Phone them—they will fly down and discuss applications with you. Prototype installations can be made at Toronto or at your plant.

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## Southwest Diesel

### Notes

By Don Taylor

CARRY-ALL for export to Holland will be powered by a NH-6-B Cummins diesel. This 220 hp engine was installed in a Carry-All manufactured by Champion Carrier, Inc. of Tulsa. Sale by Cummins Sales & Service, Inc., Oklahoma City.

DEWEY Portland Cement Co. of Dewey, Okla. repowered a large Euclid rear dump truck with a 320 hp NHRS-6-BI Cummins diesel. The sale was made by Cummins Sales & Service, Inc. of Oklahoma City.

COWAN OIL Co. of El Paso, Tex. bought a new Cummins NH-180 for a 4400 TD White truck. Sale by Cummins Rio Grande, El Paso.

HENRY Russell of El Paso has repowered an IHC—with an AC-model 225-D with a 180 hp Cummins NH-180 diesel engine. Sale by Cummins Rio Grande, El Paso, Texas.

TIBBIT'S Drilling Co. of Wichita Falls, Tex. has a new Stewart & Stevenson

model 1-24-600 Rig Electric. The unit which provides about 1200 hp for a drilling rig, has four engines with two generators.

HOMCO (Houston Oilfield Materials Co.) purchased a Stewart & Stevenson 2 GD-20 generator set powered by a 2-71 GM. Sale by Stewart & Stevenson Services, Inc.

HAYES Aircraft Corp. took delivery on a Stewart & Stevenson 30 kw generator set to use in missile work. Stewart & Stevenson Services, Inc. made the sale.

SOUTHWEST Industrial Electronics Co. of Houston, Tex. acquired a GM 4-71 torque converter engine rated at 70 hp. Sale by Stewart & Stevenson Services, Inc., Houston.

GULF Oil Corp. of Pittsburg bought two 20 kw generator sets powered by GM 2-71's for auxiliary lighting service. The ac generators were sold by Stewart & Stevenson Services, Inc., Houston.

LARGE side dump Euclid, used in mining has been repowered by a Cummins NHB-220. The operator is Uvalde Rock & Asphalt Co. of Blewett, Tex. who bought the engine from Cummins Sales & Service Inc. of San Antonio.

BILL Brady, produce hauler of San Antonio, Tex. repowered a 9000 White truck with a Cummins NHB-600, 220 hp engine purchased from Cummins Sales & Service, Inc. of San Antonio.

FERGUSON-Steere Transport Co. of Dallas, Tex. has repowered one of the trucks it uses in transporting petroleum products with a Cummins JT-6-B Turbodiesel engine. Horsepower is 175 at 2500 rpm. Cummins Sales & Service, Inc. Amarillo, Tex. supplied the new engine.

UVALDE Rock & Asphalt Co. of Blewett, Tex. repowered a 65 ton locomotive used in mining operations with two NHRS-600 Cummins diesel engines. Total horsepower of the diesel-electric locomotive now stands at 480. Cummins Sales & Service of San Antonio, Tex. made this sale.

### American Bosch Appointments

Appointments of Roger J. Kuhns as manager of government marketing and Kendall Clark as manager of military engineering at American Bosch Division, American Bosch Arma Corporation, Springfield, Mass., have been announced by Harold R. Sennstrom, vice president-sales and engineering. Mr. Kuhns will supervise the negotiations

of contracts and help formulate product developments for the military. Previously he was with American Machine & Foundry, '55 to '58, as manager, defense products group in Brooklyn. He had formerly been assistant grants administrator for the National Science Foundation and, earlier, negotiator for the U. S. Navy Bureau of Ordnance dealing in the procurement and production of guided missiles and torpedos. Mr. Clark, who has an extensive engineering background in the industrial field, will have charge of the engineering and development of products for military use. He came to American Bosch from the Utica-Bend Division of Curtiss-Wright where he was chief engineer-missiles. Before that he had been director of engineering of Maples Manufacturing Co., Dearborn, Mich., previous to which he was Master of Engineering of the Home Laundry Division, Hotpoint Corp. Mr. Kuhns is a World War II veteran and holds degrees in applied science, physics and political science from the Universities of Chicago and Washington and Masters Degrees in law and business from Harvard and Boston U. Mr. Clark, an MIT graduate, has done graduate work in aeronautical engineering. He has more than 50 patents issued covering industrial, commercial and aircraft developments.

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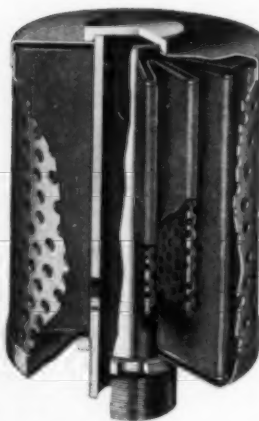
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• Screen wire mesh reinforced by pleated perforated metal provides greatly extended filtering area. This results in lower pressure drop, larger dirt capacity. Entire unit protected by perforated cover to prevent accidental damage. A wide choice of bronze, monel, or stainless media provides various degrees of positive filtration.

Capacities from 1 to 100 gpm, male or female connection. Write for Specification Sheet OCO-1057. **AIR-MAZE CORPORATION**, Cleveland 28, Ohio. Dept. DP-2.

## Montgomery Bros., Inc. Establishes New Filter Division

Expansion of the Commercial Filters Corp. line of products for the diesel industry has resulted in the creation of the new filter division in the Montgomery Brothers, Inc. organization. The new division is under the direction of S. J. Adams, Jr., a graduate chemical engineer who has over 10 years' experience with Commercial Filters products and applications. He is assisted there by C. B. Wigley. Montgomery Brothers maintains offices, warehouses, and engineering facilities in Seattle, Portland, San Francisco and Los Angeles. From these key points they efficiently service the states of Washington, Oregon, Idaho, California, Arizona and Western Nevada.

The Filter Division operating out of the San Francisco office is managed by F. W. F. Stallworthy assisted by Russ Robinson. The Filter Division of the Seattle and Portland offices is operated by John J. Meyer. Commercial Filters products include Fulflo filters, with honeycomb filter tubes, for depth filtration of diesel fuels and lubricating oils. Honan-Crane models, with resin-impregnated paper cartridges, are engineered for fullflow surface filtration. Honan-

Crane and Michiana Filters are available for by-pass filtration. A variety of filter media allows for removal of solid contaminants alone or both solid and dissolved impurities. Complete technical literature may be obtained on request of Montgomery Bros., 1053 South Olive St., Los Angeles 15, California.

## Cummins Appointments

Mr. C. R. Boll, vice president—Sales, Cummins Engine Company, Inc., has announced the following appointments: Mr. G. W. Paine, Manager of the Canadian Region with headquarters in Toronto. He has been with the Company since 1955 and previously served as coordinator for the Cummins plant in Shotts, Lanarkshire, Scotland. Mr. G. H. Weaver, Representative, Canadian Region. He will maintain his headquarters in the Northwest Regional Office in Seattle and will be responsible for the sales and service coverage in the provinces of British Columbia and Alberta. Mr. J. J. Studenic, Manager of the Southwest Region with headquarters in Los Angeles, California. He previously served as Representative—Eastern Region. Mr. D. L. Campbell, Representative in the Eastern Regional Office, New York City. He was transferred from the Cummins Factory where he served

as a Sales Engineer. Mr. Boll said the changes were made to strengthen Cummins service to manufacturers, customers and the Cummins Distributor organization.

## New Filter Brochure

A new booklet has just been published to describe the complete line of Fulflo Filters for compressed air and other gases. It includes several single tube models for operating pressures from below 125 psi up to 4,000 psi, and flow rates as high as 800 scfm. Multi-tube models, with as many as 270 Honeycomb Filter Tubes, are designed for high flow rates. Booklet includes technical information and charts on flow characteristics, physical dimensions, and metals in which the filters are made. Booklet is available on request to Commercial Filters Corp., 2 Main St., Melrose, Mass.

ITS NEW

## New R&D Brochure By Alco

A new 16 page illustrated brochure describing its integrated research and development activities has been produced by Alco Products, Inc. The two-color brochure details the company's research and development organization and its personnel working in 16 areas of current technology. It outlines the work

performed in eight areas of the new general engineering laboratory at Schenectady, highlights the contributions of Alco's seven plants to overall development projects, and stresses the projects undertaken by the company for government and industry. The booklet also contains biographies of key members of the research and development staff, and summarizes Alco's experience in wide areas of development work for government and industry. The laboratories located at Schenectady and described in the brochure include the nuclear criticality facility, radio-chemical, mechanical development, welding, thermal, chemical, metallurgical and computation sections. Technological areas in which Alco regularly pursues research and development work include diesel engine and gas turbine, centrifugal compressor, rotating equipment, heat transfer and fluid flow, mechanical engineering and design, chemical, nuclear, metallurgical and welding, missile development, oil drill rig, steel spring and forgings, vibration and experimental stress analysis and liquid metal. Theoretical engineering activities are conducted in each of those areas by small groups of specialists supported by the laboratories and other facilities best organized to promote their effectiveness.

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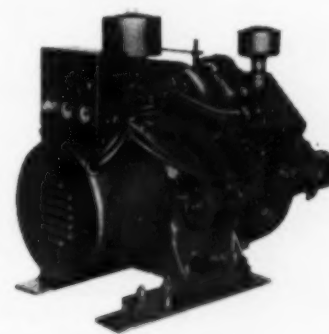
Intensive research by American MARC brings you the benefits of ultra-lightweight diesel power in a small package. Rugged one and two cylinder air and water cooled engines provide power for every imaginable power requirement... in industry, on ships, on the farm and in the oil fields.

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tion have proven that American MARC diesel engines and diesel electric generating sets insure greater power efficiency, longer equipment life, low maintenance costs and economical operation. The fact that branches of our armed services have standardized on American MARC products demonstrates their unquestioned dependability.



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## New Western Gear Facilities



Mr. William E. Hoard, manager of the industrial Products Division of Western Gear Corp. has announced the start of construction of the new offices for this division in Belmont, Calif. The new facilities will provide an additional 10,000 sq. ft. of office space for sales, engineering, purchasing, and accounting activities. Cost of the project is estimated at \$150,000. Completion is scheduled in February. Earlier this year, the manufacturing plant facilities at the 15 acre Belmont site were expanded to integrate Western Gear's Industrial Product facilities that had been located in San Francisco for many years.

## Interstate 85 On Schedule

In spite of tough going, with large outcrops of granite requiring blasting, the Ballenger Paving Co., Greenville, S. C., is on schedule on a highway building project near its home city. The company was given 270 days last May to clear, grade and

drain six miles of Interstate 85, a South Carolina section of the new 41,000 mile system of interstate and defense highways. "The contract involves moving 1,050,000 cu. yds. of unclassified material," said Ryan Graham, Ballenger Paving Superintendent. "We're gradually getting it classified—red dirt, sand rock and granite." Ballenger Paving has 14 pieces of heavy earthmoving equipment on the job, including two TS-24 Euclid, two DW-21 and three DW-20 Caterpillar scrapers, three Allis-Chalmers crawler tractors, two Caterpillar motor graders and two Caterpillar crawler tractors. Mr. Graham said many things can happen to throw a contractor off schedule, but one of the few things that can be controlled is selection of a fuel specifically designed for automotive type diesel engines. This, he added, is not the solution but is a step in the right direction. "We get another angle on how economical a premium fuel can be when we check our maintenance records," said Mr. Graham. He said that each day some 1500 gallons of Gulf Dieselect are put through the equipment. Our maintenance records show much less carbon deposit in the engines than we had expected. Our operators know that the engines deliver full power longer because they don't become sluggish. We put this down to the cleaner-burning fuel.

Gulf engineers who developed the fuel for high speed diesel engines explain that Dieselect does not form harmful deposits in filters, tanks or injectors because it is specifically refined for high speed, high power output diesels. Biggest fuel bite from the tank Gulf has installed at the job site

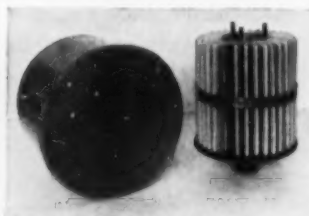
is taken by the TS-24s. With two engines and two fuel tanks, each TS-24 has a fuel capacity of 380 gals. They are capable of speeds up to 30 mph and can load 28 cu. yds. of earth at one time. Refueling of the Ballenger equipment takes place twice in the contractor's eleven-hour day. Said Mr. Graham: "Delivery has never been a problem. Gulf keeps the tank at the job site filled and we can refuel with a minimum of lost time."



Ballenger Paving Co. selected Gulf Dieselect as fuel for the 12 units—including the two Euclid TS-24s pictured here—it is using to grade six miles of Interstate 85, a South Carolina section of the new 41,000-mile system of interstate and defense highways.

He added that another valuable feature of Gulf Dieselect is its uniformity. "Ballenger works all over the Southeastern United States," he said. "No matter where we pick up the fuel we've never had to lose time adjusting fuel injectors."

## NEW DRY TYPE AIR FILTERS for engines, compressors, blowers and other industrial applications



• Designed for specific applications, the new Air-Maze Dry Type filter is particularly suitable where 1.) oil free air is required, 2.) an extremely high degree of filtration is required, 3.) the air velocity varies from one

period to another and, 4.) the dirt concentration is relatively low, except when vibration is present to help dirt removal.

The Air-Maze Dry Filter is one of the most efficient mechanical type filters available. Laboratory tests indicate better than 98% efficiency with particles of 2 micron mean diameter and practically 100% efficiency with particles of 5 microns or larger.

The Air-Maze Dry Filter type DA employs a special highgrade felt filtering media arranged in deep pleats to provide extended area, and armored on both sides by heavy galvanized cloth. Heavy gauge perforated tubing inside the media and a metal strap on the outside form a rigid unit of great strength and are corrosion protected. Made in sizes from 20 cfm to 6650 cfm. Catalog DA-1056 available. Write AIR-MAZE CORPORATION, Cleveland 28, Ohio.

## Air Circuitry by Westinghouse gives the United States single-lever engine control

**Y**OU can stop, start, change speed or direction of each engine on the new river towboat, the *United States*, with a single lever in the Westinghouse pneumatic control system.

Flexibility, reliability and safety were the prime considerations which led to the choice of Westinghouse Air Circuitry for the engine control system of the *United States*. Engines can be controlled either from the pilothouse or engine room; their speeds are maintained automatically when the *Controlair*® valve levers are locked in position. Automatic interlocks insure safe and reliable operation.

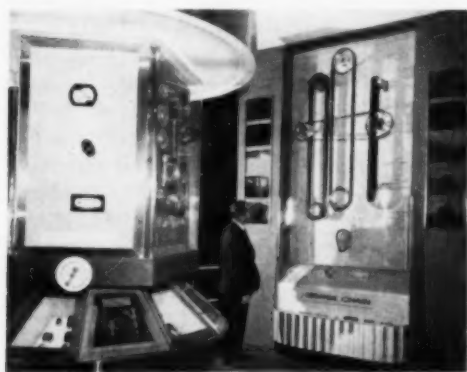
Westinghouse pneumatic control is dependable because all parts are built ruggedly . . . there are few moving parts . . . design is extremely simple. There is no fire hazard with air control.

**FREE BOOKLETS** Write for our new technical discussion of the advantages and application possibilities of Air Circuitry. In two clearly written booklets you will find answers to all your questions about pneumatic control fundamentals. Write for your free copies today. Industrial Products Division, Westinghouse Air Brake Company, Wilmerding, Pennsylvania.



## Industrial Exhibition Hall

Borg-Warner Corp. is operating one of America's most colorful industrial showplaces in the heart of Chicago. The installation—called the Borg-Warner Exhibition Hall—is the first company-owned display center of its type in Chicago and one of the



few in the country. Located at the corner of Michigan Ave. and Adams St., the hall is built on two levels covering 6,500 sq. ft. The brightly-lighted Exhibition Hall has 18 colorful, striking exhibits to show the many Borg-Warner products and services. One in particular, shows five types of chains, ingeniously arranged to give the impression that they are suspended in mid-air, can be made to revolve by the push of a button. The chains are manufactured by the Morse Chain Co., a Borg-Warner subsidiary. In the left foreground is a display showing a number of the many sizes and types of gears made by various Borg-Warner divisions.

## M/V Grunt Is Repowered

The M/V Grunt, owned by the Gulf of Georgia Towing Co. Ltd. of Vancouver, B.C. has been repowered with a series 6-110 General Motors diesel engine. The vessel is 34.5 ft. long. It has a 11.4 ft. beam and a draft of 4.1 ft. The installation of the engine was completed at the Blackball Shipyard. The G.M. diesel engine produces 220 shp continuous and 289 maximum shp at 1800 rpm. The unit is fitted with a 3:1 ratio hydraulically operated G.M. Allison reverse and reduction gear coupled to a 3¼ in. monel tailshaft turning a 48 in. dia. by 23 in. pitch propeller at 600 rpm. Other



features include 32 volt starting with a 550 watt generator. A keel cooler provides closed circuit fresh water cooling. A belt driven power-take-off mounted on the front of the engine drives a hydraulic pump for the operation of the towing winch. The G.M. diesel engine was supplied by Hoffars Ltd. of Vancouver, G.M. diesel marine distributor for British Columbia.

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The only purpose served by a truck or a fleet of trucks is to move weight from one point to another. Moving this weight profitably is essential...and this depends on operating economies, maintenance of schedules, driver satisfaction and safety. These factors demand *maximum truck performance and peak horsepower* at all times.

Proper performance can no longer be assured by time consuming and inconclusive road tests that expose both mechanic and equipment to traffic hazards and laws. Local road conditions seldom duplicate those which truck and driver encounter on regular runs. But a Clayton Chassis Dynamometer *duplicates these and all other road conditions* inside your own shop, safely, economically and quickly. Write or call your Clayton representative today.

## ASK ABOUT Clayton ENGINE DYNAMOMETERS

There is a Clayton Engine Dynamometer for every engine service shop regardless of size. Engine run-in and test under actual road load conditions...

Prevent costly do-over-work  
Greatly reduces road breakdowns  
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From the 60 gal.-per-hour steam cleaner, for handling small jobs, to the big, new Clayton-Sellers Hydraulic jet unit that really knocks off road grime and mud collected by the big rigs, there's a Clayton Steam Cleaner that does the job efficiently and economically.

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## Eastern Diesel Topics

By Robert Dymont

INSTALLATION of four Norse Electric CJC filters in Hunts Point, N.Y. Pollution Control Plant, it's reported, has meant savings of \$735 per engine per year in terms of cleaning and filter replacement costs. Also reported are a 500 per cent increase in continuous filtration time and lube oil savings of 100 gal. a month. The filters are installed on the plant's 2 generator-blower combinations and 2 blowers driven by Cooper-Bessemer 900 hp gas diesels.

AN 8 ton Oshkosh diesel engine truck with body was purchased by the French Creek, N. Y. Town Board, from the H. K. Nuttall Equipment Company, Sherman, N.Y. The new diesel vehicle is equipped with complete snow fighting equipment such as a plow, a wing and hoist.

MORE than 500 guests attended the recent dedication of Bucyrus-Erie Co. of Canada, Ltd., new plant at Guelph, Ontario. The company staged a plant tour and equipment demonstration.

NEW JERSEY is seeking \$44¼ million in next year's budget for road work; this would augment over \$95 million in federal aid to provide a \$140 million road program. Of the local funds, \$30 million would be used to match federal aid, using the balance for roads financed by state funds only. The department

had a \$74 million program for the present 1958 fiscal year, with sixty-eight contracts now in force.

MODERNIZATION of the water system of progressive Port Washington, Long Island, N.Y. included the installation of two Caterpillar D-375 Diesel engines in the Water District pumping station. The water service system serves 22,000 people in the community. The Caterpillar engines, rated at 350 hp, intermittent, each drive a 1500 gpm DeLaval pump operating against a 400 ft. head. A million-gallon ground storage reservoir is used to provide storage and to permit pumping at a constant rate, either into the reservoir or to the distribution system to supply daytime peak loads. The engines are governed to operate at 80 percent of their rated capacity, giving a substantial margin of reserve power to meet overloads due to fire, excessive sprinkling or other requirements. The Cat engines were purchased from H. O. Penn Machinery Co. with headquarters in Long Island and New York City.

GRIFFIN Equipment Corp. announces that its appointment as authorized dealer for the Allison Division of General Motors Corp. for Allison torque converters and torquomatic transmissions, with complete parts, service and sales, in New York and New Jersey. Bruce Smart will be in charge of this operation. The company is also planning for an exchange convertor and transmission in the future.

WHILE the Wawenock's 400 hp Diesel gave a good account of itself, Capt. Bob Anderson of Thomaston, Maine, agreed with Harvey Gamage, the builder, that more power for faster trips and more power for dragging would be advisable. This prompted them to purchase a larger unit. The new engine is a Baldwin model R-606-SC, 6 cylinder, 12¾ x 15½ in., four cycle turbocharged, direct reversing unit rated at 720 bhp at 400 rpm. It is directly connected to a five blade 66 x 44 Columbian propeller. The existing 7 in. Monel propeller shaft was reused. The engine and equipment were installed at the Hathaway Machinery Co., Inc. of Fairhaven, Mass. and was later taken back to the Gamage yards where the work was completed. She is now at sea fishing. The dragger Wawenock, built in 1953 at the Bristol Yacht Building Co., South Bristol, Maine, is said to be the largest wooden dragger to be constructed on the Maine coast during the past 25 years.

W. L. BALLENTINE Co. Ltd., equipment distributors with head offices in Toronto, has just received the first of the new 105 hp International TD-15 crawler tractors, according to R. H. Kelly, the firm's sales manager. "The six-cylinder engine gives this new tractor more power and smoother performance than any other crawler in the 100-hp class", said a spokesman for the distributor.

NORTHWEST shovel powered by a Murphy diesel has been purchased by the Buckley & Company, Inc., Philadelphia, Pa. for work on the Roosevelt Boulevard project in Philadelphia, Pa. This is the 6th Northwest shovel in the Buckley fleet.

DIESELS on Baltimore's powerful new fireboat easily push it along at a snappy 17 mph while it discharges 12,000 gallons of water every minute.

CLARENCE L. Hough, Selden, Long Island Contractor, used two Caterpillar diesel DW 15 tractors with No. 428 scrapers to remove 130,000 cubic yards of sand in building two drainage sumps at East Meadow for the Nassau County Department of Public Works.

THOMAS Callahan Equipment Company announces the moving of his firm from Cranford, New Jersey to 111 Michigan Avenue, Kenilworth, New Jersey.

ASSOCIATED Pennsylvania Constructors annual meeting will be held March 12-14 at the Chalfonte-Haddon Hall in Atlantic City, New Jersey, while the Association of Highway Officials of North Atlantic States will hold their annual meeting in the same city on March 18-20 at the Traymore Hotel.

ONE of Nello L. Teer Company's Durham, N. C., current projects is the six million plus Bear Creek Reservoir job located about 20 miles south of Scranton, Penn. An earth fill dam is being built just below the point where Bear Creek empties into the Lehigh River. As Nello Teer could spare only one of their several Marion type 111-M shovels for this job, a new machine had to be brought in. This new shovel, another type 111-M was delivered to the jobsite. Teer is using ten 28 yd. diesel powered Caterpillar DW-20 bottom dump trucks and 18 yd. Euclid rear dump trucks to transport the fill material over a 1½ mile high-speed haul road to the construction site.

BRACKEN Construction Co., Sligo, Penn. used a fleet of diesel powered Allis-Chalmers machines to help in the completion of the relocation of Route 861 near Bethlehem, Penn., well ahead of the 135-days allotted. HD-21 and HD-16 tractor-dozers and TS-260 motor scrapers and other equipment were utilized on the project.

KOEHRING-Waterous Ltd., Brantford, Ontario, recently completed and delivered the first 1½ cu. yd. Koehring excavator manufactured in Canada. This Model 605 Koehring Shovel was purchased by an Ottawa contractor and will be used in a rock quarry. Diesel powered and equipped with a torque convertor, it is capable of excavating up to 500 tons of rock per hr.

### Rolls-Royce Power for Dam Construction

Twenty pieces of equipment powered by Rolls-Royce diesel engines will be going into service on the Hart Jaune Power Development in Northern Quebec, reports Rolls-Royce of Canada. The Foundation Co. of Canada are contractors for the dam, which will supply power for Quebec Cartier Mining Company's projected iron ore mine in that area. The equipment consists of 15 Euclid B1TD 22 ton rear dumpers (C6S supercharged six-cylinder engines developing 250 bhp at 2100 rpm), four 100 kw Petbow generating sets (C6S supercharged six cylinder, 156 bhp at 1800 rpm) and one rock crusher (C8S supercharged eight-cylinder cowled power-pack, 240 bhp at 1200 rpm).

**HERE IS IMPORTANT INFORMATION!** The completely new 1958 edition of the **DIESEL ENGINE CATALOG**, Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

## MECROME LINER POROSITY

as uniform as the rifling of bullets from the same gun!



The distribution of pockets that retain the lubricating oil on the bearing surfaces of Mecrome liners is as uniform as the rifling of bullets fired from the same gun! This means "break in" periods are rapid. The bearing surface has no large solid unetched areas that cause friction where the liners contact the rings. This even distribution of pockets also results in long liner life as there are no large soft spots that wear out prematurely. Keep diesels in service longer. Send us a trial order today.



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## Eastman Technical Bulletin

Eastman Technical Bulletin 100, describing medium pressure Eastman hydraulic hose and tube assemblies, is now available for distribution. This is another in the series of new bulletins published by the Eastman Mfg. Co., which follows the same easy-to-use and easy-to-order arrangement—according to pressure requirements. This bulletin contains 36 pages devoted to exclusive features found in medium to low pressure Eastman hydraulic hose and tube assemblies, with accurate dimensional drawings and complete tables of available sizes. Those who have requested and received the preceding issue of this new series—Bulletin 200 on high pressure assemblies—will also want to include this new technical Bulletin 100 in their files. Write Eastman Mfg. Co., Manitowoc, Wis.

**ITS NEW**

## Ultra-Small Micro Switch

A new ultra-small quick-connect switch with the highest electrical rating of any similar tiny switch has been introduced by Micro Switch of Freeport, Ill., a division of Minneapolis-Honeywell Regulator Co. Underwriters' Laboratories, listing for the new switch is 10 amperes, 125 or 250 vac; 1/2 ampere, 125 vdc; 1/4 ampere, 250 vdc. Lead receptacles for the quick connect switch (designated V3-1-D8) can be attached in seconds. The contact arrangement is single-pole double-throw and the switch may be wired normally-open or normally-closed. A wide variety of roller and lever type auxiliary actuators may be easily attached for applications where the operating direction is not in-line with the plunger motion. Additional information may be obtained by writing Micro Switch Division, Minneapolis-Honeywell, Freeport, Ill., for Data Sheet 146.

**ITS NEW**

## Needles Compressor Station To Increase Facilities

The M.A. Nishkian & Co., Consulting Engineers of Long Beach, has been assigned to prepare plans and specifications to increase the facilities of the Needles Gas Compressor Station. Two additional 2000 hp. turbocharged gas engine compressors will be included in the plans for the auxiliary power plant, according to M.A. Nishkian, head of the engineering firm. This will be a part of the second increment of 10,000 additional horsepower that had been contemplated. Earlier this year, the booming Southern California area was recipient of a boost in their supply of natural gas well beyond the one billion cu. ft. a day mark. Located on a 60 acre site near the California-Arizona border

town of Needles, the multi-million dollar plant of the Southern California and Southern Counties Gas Companies, has five 2000 hp. Clark turbocharged gas engine compressors that send millions of cubic feet of natural gas pouring through their distribution systems. The Needles pipeline is the third major artery bringing natural gas from mid-continent sources to Southern California. With the present five compressors, the station has a design capacity of 227.6 million cu. ft. of gas a day with 83 million cu. ft. of usable line storage. With the planned additional two compressors bringing the total to 7, the station will be at full strength, with 14,000 hp., which will have a capacity of 328.8 million cu. ft., with 78.1 million usable line storage. The present compressor facilities were designed by M. A. Nishkian & Co., and were constructed by Peter Kiewit Sons. In addition to the compressor building, the station includes warehouse, shop and office building, electrical generator building, cooling tower, main engine jacket water coolers, and storage tanks for acid, chlorine, compressed air, oil, and raw treated water. "Intake line pressure at the station is designed for 485 psi, with a discharge line pressure at Quigley Station near Los Angeles of 350 psi", stated M. A. Nishkian, engineer of the project.

## C. L. Hastings Named President

Mr. Clark L. Hastings has been elected president of Rochester Mfg. Co. He moved up to the position from vice president in charge of sales and advertising. Mr. William Mulcahy, chairman of the board, made the announcement following a meeting of the Board of Directors. Hastings succeeds Allen H. Ottman, who resigned last April to become head of the Forbes and Wagner firm of Silver Creek. Mr. Hastings has been instrumental in the growth of the instrument manufacturing firm which was founded by his father, the late Herbert Hastings. Early this year Hastings was named president of the company's wholly owned subsidiary, Rochester Mfg. Co. of California in Pasadena. This plant manufactures the Lindsay high pressure gauge currently used on the Atlas ICBM, B-52 bombers and numerous other military aircraft and missile equipment. Mr. Hastings joined RMC in June, 1928 following his graduation from Union College. He worked in plant operations and then in sales. In 1938 Hastings was named vice president and sales manager. This year he became president of RMC of California while continuing as company vice president. Mr. Hastings is a member of the board of the National Oil Heat Institute and for the past 20 years has been active in the Society of Automotive Engineers.

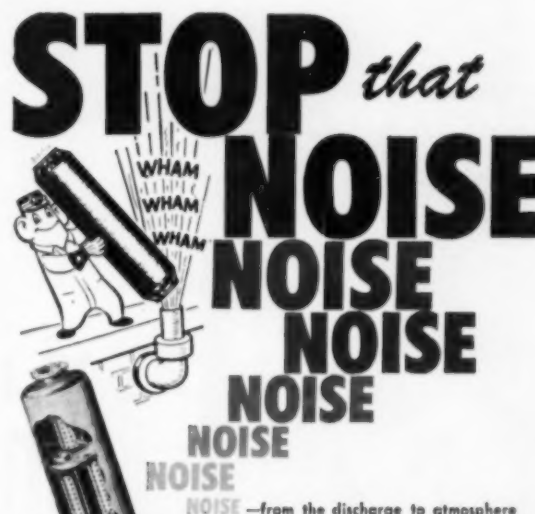
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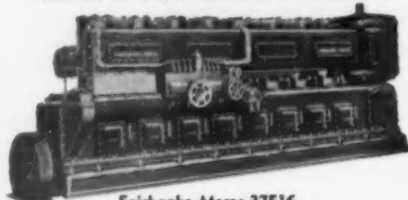
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## Diesel Tugs Tackle Mighty Towing Task

In late October the Detroit River was the scene of a colossal marine towing job when a 10,000 ton steel caisson was tug-escorted out into open water, spotted according to plan and then scuttled onto the rock-solid river bottom. It meant that a \$27,000,000 river project had advanced another stage toward completion and 2,770,000 residents of Wayne County, Mich., had moved another step toward realizing a new source of water. The submerged structure of plate steel will serve to house new water-intake equipment in Canadian waters that will eventually supply growing Wayne County with 76,000,000 gals. of water daily. The caisson—68 ft. high and 60 ft. wide resembling an unfinished boat hull with a bow at both ends—was the largest caisson ever constructed on the Detroit River. Now only four feet of the structure remains above water to serve as a base for a maintenance building which will be built upon completion of the intake station. For two hours the combined might of two diesel tugs and an assisting landing craft battled 15 mph winds and swift river currents to bring the huge caisson two miles downriver from its construction site near Windsor to a location off Fighting Island, outside the shipping channel.

Under contract to the Frank Becker Towing Company of Detroit, the move proceeded much of the



Tugs of the Frank Becker Towing Company of Detroit move downriver with the 10,000 ton caisson. The G. F. Becker tug, prominent in photo, is a 63 ft. all-steel craft powered by a 335 hp General Motors Diesel engine. Prior to her use as a river tug, she was a mail boat for freighters on the river.

way with the G. F. Becker tug, powered by a General Motors diesel engine, providing the main tow from a position forward the caisson while a second diesel tug the B. H. Becker was positioned rear to act as a rudder. Trickiest part of the tow came on the approach to the designated intake site outlined close to the Canadian shore by U-shaped floating docks. There the caisson was directed beyond the site and then edged back upriver against 4 mph currents toward the open end of the dock structure. With the movement of the caisson practically imperceptible at this point, Captain Frank Becker directing the approach shouted, "She's just like an ornery bull that just doesn't want to get into its stall." Finally with the caisson snug in place, the first of 9,000 yds. of concrete was dis-



Tugs battle swift river currents as they edge upriver toward contractor's docks where the giant was lowered to the river bed. Approximately 9000 tons of concrete were used to lower the structure. Job was completed in 60 hours following its arrival at the site.

charged into parts of the hull-like structure to settle it to the river bed. Work now moves ahead rapidly on a 12 ft. tunnel to connect the point of intake with a receiving station in Allen Park, Mich., a neighboring downriver community to Detroit.

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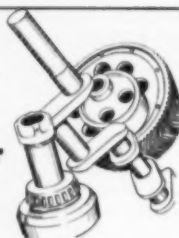
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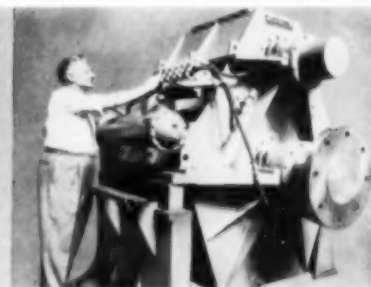
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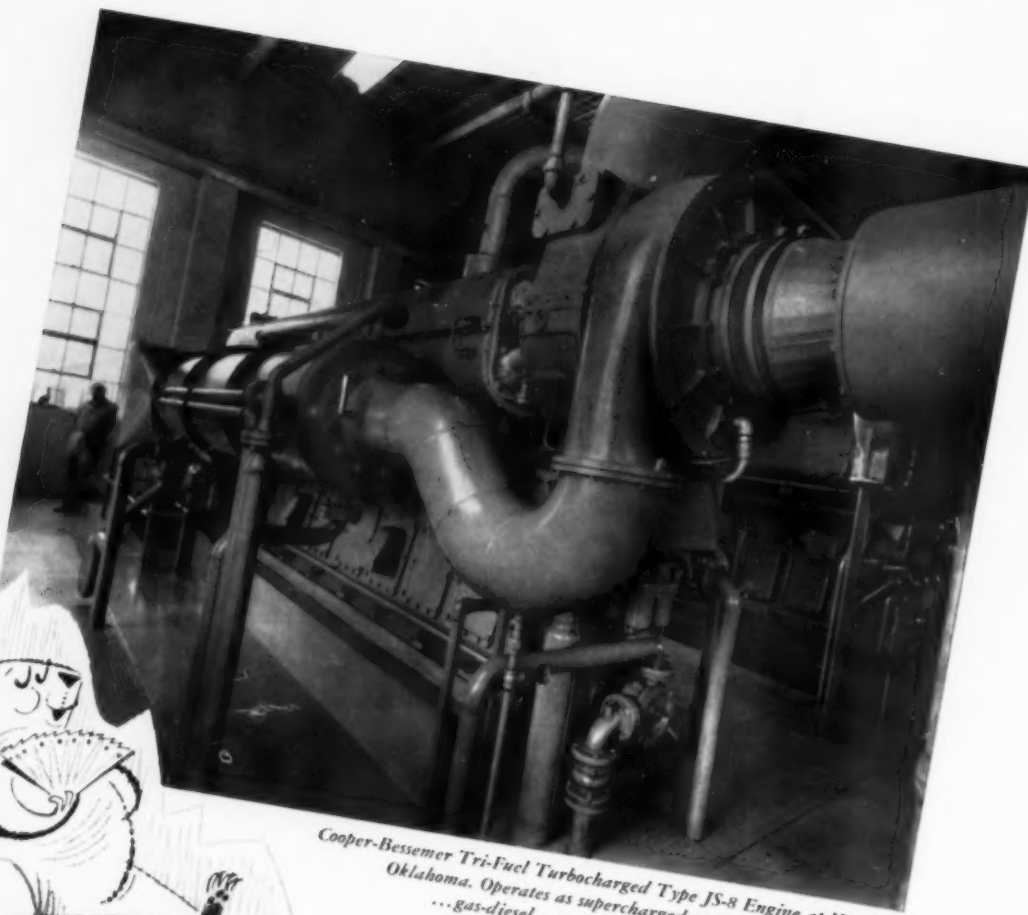
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